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The Third Spectrum of Praseodymium (Pr III) in the Vacuum Ultraviolet

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Measurements of the spectrum of doubly ionized praseodymium from 821 to 2103 Å are given. One hundred fifty-three energy levels deduced from these wavelengths and an earlier line-list of longer wavelengths are presented. These levels are identified with the configurations $4f^26s$, $4f^27s$, $4f^28s$, $4f^26p$, $4f^26d$, $4f^25f$, $5d^24f$, and $4f5d6s$ and are given term designations. Radial energy integrals belonging to these configurations are parametrically deduced from the known levels.

A value of 21.625 eV (174420 cm^{-1}) for the ionization energy of Pr III, with an estimated uncertainty of 0.016 eV (130 cm^{-1}), is derived from the $4f^2ns$ series ($n=6, 7, 8$).

Key words: Energy levels; interaction parameters; praseodymium; third spectrum; vacuum ultraviolet; wavelengths.

1. Introduction

The analysis of Pr III in the wavelength range from 2025 to 10716 Å [1,2][1] revealed nearly completely the energy level structure of the four low-lying configurations $4f^3$, $4f^25d$, $4f^26s$, and $4f^26p$, and some levels of $5d^24f$ and $4f^26d$. I have extended the observations to shorter wavelengths and measured 2948 lines in the range from 821 to 2103 Å. These new data have led to a considerable increase in the number of known levels of the $5d^24f$ configuration and to the discovery of levels belonging to the $4f5d6s$, $4f^25f$, and $4f^28s$ configurations. In addition, a reexamination of the old line-list yielded more levels of the configurations $4f^26s$, $4f^26d$, and $4f^27s$. In all, 153 energy levels of Pr III have been newly established.

The configurations to which they belong were treated theoretically for the purpose of determining parametrically the radial energy integrals and of calculating the level positions and eigenvectors. These calculations helped to confirm the experimental results and to locate unknown levels, as well as to provide an interpretation of the configurations in the most appropriate coupling schemes.

Of particular interest are the mutually interacting odd configurations $4f^26p$, $5d^24f$, and $4f5d6s$, which were treated as one complex. Many levels are strongly perturbed and were found to contain large percentages of terms of several configurations. In the $5d^24f$ configuration the addition of an "effective" two-body configuration interaction parameter for nonequivalent electrons decreased the rms error of the calculation by 25 percent.

The ionization energy of Pr III was calculated in ref. 2 by means of tentatively identified $4f^26d$ levels to form a $4f^2(^3H)nd$ ($n=5, 6$) series. The new analysis provides the $4f^2(^3H)ns$ series ($n=6, 7, 8$) with which to determine a more reliable value.

Three levels given in reference 2 which were found to be poorly substantiated and have now been discarded are listed below:

Rejected levels	J	Config.	New levels
45848.37 cm^{-1}	$2\frac{1}{2}$	$4f^26s$	45807.16 cm^{-1}
68676.55 cm^{-1}	$2\frac{1}{2}$	$4f^26p$	
79378.43 cm^{-1}	$2\frac{1}{2}$	$4f^26p$	79366.69 cm^{-1}

2. Observations

For the most part, the procedure outlined in reference 2 for obtaining the spectrum Pr III has been followed. The sliding spark was operated at peak currents of 50 and 500 A to enhance the third and fourth spectra selectively. I departed from the earlier method of producing the second spectrum by means of an arc. Instead a 6 A sliding spark was used which gave a more clear-cut distinction between second and third spectra when compared with the 50 A spark, as well as sharper lines. This technique has already been used in the classification of Ce III [3].

The new extension of the observations of Pr III to shorter wavelengths was made with a 10.3 m Eagle vacuum spectrograph, utilizing a grating of 1200

[1] Figures in brackets indicate the literature references at the end of this paper.

grooves/mm blazed at 1200 Å. The first order of diffraction was photographed, giving a reciprocal dispersion of 0.78 Å/mm. One half to 2 hr exposures were required to record the spectrum of the spark, operating at a repetition rate of 15 sparks per second. Calibration spectra of C, N. O, Ar, Si, Ge, and Cu [4, 5, 6, 7, 8] were obtained from pulsed rf-excited electrodeless lamps and hollow cathode discharges.

Two to five measurements of the lines in the 50 A spark were made, the number depending on the recurrence of a line on progressively weaker exposures. From the variation of wavelengths obtained with different exposures the accuracy of the final values is estimated to be ± 0.004 Å. Systematic shifts between the various sets of measurements were removed by standardizing on wavelengths of internal impurities of C, N, O, and Si.

The new measurements overlap the previous list [1] in the region from 2000 to 2103 Å and considerably augment it, thus indicating that stronger exposures may be needed beyond this overlap. Lines of intensity designated as 1 in the old list are usually assigned 200 in the new list, and the other common lines are correspondingly stronger.

A complete tabulation of the newly observed lines appears in table X. The wavelengths given in the first column are the values in vacuum. Following this are the visually estimated intensities with the following descriptive notations:

cl = measurement affected by a close neighboring line,
bl = a blend of two or more lines,
h = hazy,
w = wide.

Under "classification" appear the two energy levels from which the line originates, followed by a subscript *J*-value, and where appropriate a superscript degree mark representing odd parity. Double classifications of lines are given without repeating the wavelength.

In table I, newly classified lines from the longer wavelength list of reference 1 are given. Among these are lines having hfs, for which the following additional notations in the intensity column appear:

**r* = strongest component of flag pattern shaded to red,
**v* = strongest component of flag pattern shaded to violet,

TABLE I. *Newly classified lines of* Pr III, $\lambda > 2103$Å

λ_{air} Å	Intensity	σ (cm^{-1})	Classification	λ_{air} Å	Intensity	σ (cm^{-1})	Classification
4650.609	9* *v*	21496.54	$13887^{\circ}_{7/2} - 35384_{5/2}$	3011.282	20 * *v*	33198.77	$50227_{5/2} - 83426^{\circ}_{5/2}$
4334.697	9*w*	23063.18	$11761^{\circ}_{9/2} - 34825_{7/2}$	3006.469	60 * *r*	33251.92	$38726_{7/2} - 71978^{\circ}_{7/2}$
3607.068	4 * *r*	27715.46	$52026_{3/2} - 79742^{\circ}_{1/2}$	3004.002	10 * *r*	33279.22	$52026_{3/2} - 85306^{\circ}_{5/2}$
3577.336	8 * *v*	27945.80	$33659_{5/2} - 61605^{\circ}_{7/2}$	3002.106	2	33300.24	$38694_{5/2} - 71994^{\circ}_{5/2}$
3567.897	1*bl*	28019.71	$50869_{1/2} - 78889^{\circ}_{3/2}$	2982.236	9 * *r*	33522.11	$45844_{3/2} - 79366^{\circ}_{5/2}$
3565.845	9 * *v*	28035.78	$50658_{13/2} - 78694^{\circ}_{11/2}$	2980.583	5 * *r*	33540.70	$50869_{1/2} - 84409^{\circ}_{3/2}$
3564.405	30 * *r*	28047.13	$50647_{11/2} - 78694^{\circ}_{11/2}$	2978.907	9 * *v*	33559.57	$45807_{5/2} - 79366^{\circ}_{5/2}$
3510.532	20 * *v*	28477.56	$50658_{13/2} - 79136^{\circ}_{13/2}$	2976.347	40 * *v*	33588.43	$45807_{5/2} - 79395^{\circ}_{7/2}$
3509.142	3 * *r*	28488.86	$50647_{11/2} - 79136^{\circ}_{13/2}$	2963.032	2	33739.36	$36642_{13/2} - 70381^{\circ}_{13/2}$
3462.700	1 * *r*	28870.93	$52026_{3/2} - 80897^{\circ}_{3/2}$				
3462.432	1 * *r*	28873.16	$50869_{1/2} - 79742^{\circ}_{1/2}$	2940.896	7 * *v*	33993.30	$51312_{5/2} - 85306^{\circ}_{5/2}$
3412.607	7 * *r*	29294.71	$50869_{1/2} - 80164^{\circ}_{3/2}$	2933.827	1	34075.21	$37919_{7/2} - 71994^{\circ}_{5/2}$
3402.969	50 * *r*	29377.68	$52026_{3/2} - 81404^{\circ}_{5/2}$	2930.192	50 * *v*	34117.48	$35291_{9/2} - 69408^{\circ}_{11/2}$
3379.131	50 * *v*	29584.91	$51312_{5/2} - 80897^{\circ}_{3/2}$	2924.661	2 * *v*	34181.99	$50227_{3/2} - 84409^{\circ}_{3/2}$
3377.141	100 * *v*	29602.34	$45807_{5/2} - 75409^{\circ}_{3/2}$	2910.612	70 * *v*	34346.98	$28885_{9/2} - 63232^{\circ}_{7/2}$
3367.350	200 * *v*	29688.42	$35291_{9/2} - 64979^{\circ}_{7/2}$	2890.842	2	34581.86	$39024_{9/2} - 73606^{\circ}_{9/2}$
3359.973	3 * *v*	29753.59	$45807_{5/2} - 75560^{\circ}_{5/2}$	2885.001	6 * *r*	34651.87	$38726_{7/2} - 73378^{\circ}_{7/2}$
3358.083	30 * *r*	29770.34	$45844_{3/2} - 75614^{\circ}_{5/2}$	2876.229	1	34757.55	$69138^{\circ}_{9/2} - 103895_{7/2}$
3353.866	50 * *v*	29807.77	$45807_{5/2} - 75614^{\circ}_{5/2}$	2857.700	4	34982.90	$37011_{5/2} - 71994^{\circ}_{5/2}$
3322.203	6 * *v*	30091.85	$51312_{5/2} - 81404^{\circ}_{5/2}$	2851.486	6 * *r*	35059.13	$33466_{11/2} - 68525^{\circ}_{11/2}$
3161.330	7 * *r*	31623.10	$50869_{1/2} - 82492^{\circ}_{3/2}$	2838.461	7 * *r*	35220.00	$35801_{7/2} - 71021^{\circ}_{9/2}$
3147.878	9 * *v*	31758.23	$35291_{9/2} - 67049^{\circ}_{9/2}$	2827.668	3	35354.43	$36640_{7/2} - 71994^{\circ}_{5/2}$
3122.646	7 * *v*	32014.84	$45807_{5/2} - 77821^{\circ}_{5/2}$	2819.342	2	35458.83	$37919_{7/2} - 73378^{\circ}_{7/2}$
3108.884	7 * *r*	32156.56	$50869_{1/2} - 83025^{\circ}_{3/2}$	2812.509	9 * *v*	35544.98	$32760_{13/2} - 68305^{\circ}_{15/2}$
3098.474	3 * *v*	32264.59	$50227_{3/2} - 82492^{\circ}_{3/2}$	2803.090	3	35664.41	$48745_{5/2} - 84409^{\circ}_{3/2}$
3087.175	1 * *r*	32382.56	$52026_{3/2} - 84409^{\circ}_{3/2}$	2797.924	1*bl*	35730.25	$65935^{\circ}_{7/2} - 101665_{5/2}$
3061.277	9 * *v*	32656.61	$45807_{5/2} - 78463^{\circ}_{7/2}$	2784.154	1	35906.96	$39732_{11/2} - 75640^{\circ}_{11/2}$
3039.680	7	32888.63	$45805_{9/2} - 78694^{\circ}_{11/2}$	2776.318	4	36008.30	$48401_{3/2} - 84409^{\circ}_{3/2}$
3036.913	8	32918.59	$44903_{5/2} - 77822^{\circ}_{5/2}$	2774.708	4	36029.19	$39732_{11/2} - 75762^{\circ}_{9/2}$
3018.701	20 * *v*	33117.19	$51312_{5/2} - 84430^{\circ}_{7/2}$	2766.880	3	36131.12	$35863_{3/2} - 71994^{\circ}_{5/2}$

TABLE I. *Newly classified lines of* Pr III, $\lambda > 2103$ *Å* – Continued

λ_{air} Å	Intensity	σ (cm^{-1})	Classification	λ_{air} Å	Intensity	σ (cm^{-1})	Classification
2741.262	1	36468.76	$66148^{\circ}_{13/2}-102617_{11/2}$	2564.509	4	38982.14	$65922^{\circ}_{11/2}-104904_{11/2}$
2734.368	8	36560.70	$48745_{5/2}-85306^{\circ}_{5/2}$	2563.474	6	38997.87	$36642_{13/2}-75640^{\circ}_{11/2}$
2732.952	1	36579.64	$68987^{\circ}_{7/2}-105566_{9/2}$	2561.773	6	39023.77	$63593^{\circ}_{9/2}-102617_{11/2}$
2720.409	1	36748.29	$66735^{\circ}_{13/2}-103484_{15/2}$	2559.865	1	39052.85	$68801^{\circ}_{7/2}-107854_{9/2}$
2712.384	2	36857.01	$35137_{3/2}-71994^{\circ}_{5/2}$	2559.277	2	39061.82	$63768^{\circ}_{7/2}-102830_{9/2}$
2707.422	2	36924.56	$68525^{\circ}_{11/2}-105450_{11/2}$	2558.675	5	39071.01	$61717^{\circ}_{5/2}-100788_{7/2}$
2706.611	5	36935.62	$36670_{11/2}-73606^{\circ}_{9/2}$	2558.537	4	39073.12	$61357^{\circ}_{9/2}-100430_{9/2}$
2704.403	1	36965.78	$36640_{7/2}-73606^{\circ}_{9/2}$	2557.323	3	39091.67	$36670_{11/2}-75762^{\circ}_{9/2}$
2699.300	5 * r	37035.65	$38726_{7/2}-75762^{\circ}_{9/2}$	2556.813	4	39099.46	$64235^{\circ}_{9/2}-103335_{9/2}$
2687.981	6 * v	37191.60	$38448_{9/2}-75640^{\circ}_{11/2}$	2555.353	7	39121.80	$62558^{\circ}_{11/2}-101680_{13/2}$
2687.506	1	37198.17	$63232^{\circ}_{7/2}-100430_{9/2}$	2554.979	1	39127.53	$38694_{5/2}-77822^{\circ}_{5/2}$
2686.455	3	37212.73	$63576^{\circ}_{5/2}-100788_{7/2}$	2549.531	1	39211.13	$67870^{\circ}_{9/2}-107081_{9/2}$
2673.055	5	37399.26	$65909^{\circ}_{5/2}-103308_{7/2}$	2545.790	9	39268.75	$64215^{\circ}_{13/2}-103484_{15/2}$
2666.218	2	37495.16	$63576^{\circ}_{5/2}-101071_{5/2}$	2543.644	1	39301.88	$66148^{\circ}_{13/2}-105450_{11/2}$
2663.415	3	37534.62	$65295^{\circ}_{7/2}-102830_{9/2}$	2541.080	8	39341.53	$61605^{\circ}_{7/2}-100947_{9/2}$
2650.675	1	37715.01	$63232^{\circ}_{7/2}-100947_{9/2}$	2540.311	7	39353.44	$61717^{\circ}_{5/2}-101071_{5/2}$
2647.019	1	37767.10	$68978^{\circ}_{5/2}-106745_{5/2}$	2539.759	5	39361.99	$68492^{\circ}_{7/2}-107854_{9/2}$
2640.290	4	37863.35	$68801^{\circ}_{7/2}-106665_{7/2}$	2537.099	2	39403.26	$39732_{11/2}-79136^{\circ}_{13/2}$
2634.707	5	37943.58	$69138^{\circ}_{9/2}-107081_{9/2}$	2536.648	7	39410.26	$39725_{15/2}-79136^{\circ}_{13/2}$
2629.918	1	38012.66	$65295^{\circ}_{7/2}-103308_{7/2}$	2534.759	9	39439.63	$62240^{\circ}_{11/2}-101680_{13/2}$
2626.210	2	38066.33	$62558^{\circ}_{11/2}-100625_{11/2}$	2531.925	7	39483.77	$66148^{\circ}_{13/2}-105632_{13/2}$
2626.016	1	38069.14	$68676^{\circ}_{5/2}-106745_{5/2}$	2530.464	9	39506.57	$44903_{5/2}-84409^{\circ}_{3/2}$
2624.624	1	38089.33	$63576^{\circ}_{5/2}-101665_{5/2}$	2529.726	4	39518.09	$63816^{\circ}_{11/2}-103335_{9/2}$
2622.448	5	38120.94	$68544^{\circ}_{9/2}-106665_{7/2}$	2529.430	2	39522.72	$68331^{\circ}_{7/2}-107854_{9/2}$
2619.706	3	38160.83	$69138^{\circ}_{9/2}-107299_{7/2}$	2529.110	9	39527.72	$65922^{\circ}_{11/2}-105450_{11/2}$
2619.162	1	38168.76	$66735^{\circ}_{13/2}-104904_{11/2}$	2528.330	2	39539.91	$63768^{\circ}_{7/2}-103308_{7/2}$
2618.891	2	38172.71	$68492^{\circ}_{7/2}-106665_{7/2}$	2526.636	1	39566.42	$63768^{\circ}_{7/2}-103335_{9/2}$
2617.740	3	38189.49	$62240^{\circ}_{11/2}-100430_{9/2}$	2525.123	8	39590.12	$61357^{\circ}_{9/2}-100947_{9/2}$
2616.047	1	38214.21	$63232^{\circ}_{7/2}-101446_{7/2}$	2521.677	1	39644.22	$65922^{\circ}_{11/2}-105566_{9/2}$
2613.377	3	38253.24	$62535^{\circ}_{9/2}-100788_{7/2}$ $68492^{\circ}_{7/2}-106745_{5/2}$	2521.021	7	39654.54	$64150^{\circ}_{11/2}-103805_{13/2}$
				2520.662	2	39660.18	$64235^{\circ}_{9/2}-103895_{7/2}$
2611.527	1	38280.34	$68801^{\circ}_{7/2}-107081_{9/2}$	2517.515	8	39709.76	$65922^{\circ}_{11/2}-105632_{13/2}$
2610.351	8	38297.59	$66301^{\circ}_{15/2}-104598_{13/2}$	2516.337	1	39728.35	$61717^{\circ}_{5/2}-101446_{7/2}$
2606.515	5	38353.95	$35024_{7/2}-73378^{\circ}_{7/2}$	2515.487	7	39741.77	$63593^{\circ}_{9/2}-103335_{9/2}$
2604.457	3	38384.25	$62240^{\circ}_{11/2}-100625_{11/2}$	2509.243	7	39840.66	$61605^{\circ}_{7/2}-101446_{7/2}$
2603.320	2	38401.01	$67049^{\circ}_{9/2}-105450_{11/2}$	2505.358	1	39902.44	$37919_{7/2}-77822^{\circ}_{5/2}$
2603.263	1	38401.86	$64215^{\circ}_{13/2}-102617_{11/2}$	2503.391	5	39933.78	$35828_{9/2}-75762^{\circ}_{9/2}$
2602.446	2	38413.91	$68331^{\circ}_{7/2}-106745_{5/2}$	2502.526	5	39947.59	$61717^{\circ}_{5/2}-101665_{5/2}$
2602.224	1	38417.19	$37197_{3/2}-75614^{\circ}_{5/2}$	2499.968	10	39988.46	$63816^{\circ}_{11/2}-103805_{13/2}$
2599.960	1	38450.64	$66148^{\circ}_{13/2}-104598_{13/2}$	2499.686	6	39992.97	$38701_{13/2}-78694^{\circ}_{11/2}$
2595.448	1	38517.48	$67049^{\circ}_{9/2}-105566_{9/2}$	2498.297	1	40015.20	$68544^{\circ}_{9/2}-108559_{11/2}$
2592.832	5	38556.34	$68525^{\circ}_{11/2}-107081_{9/2}$	2497.143	2	40033.69	$68525^{\circ}_{11/2}-108559_{11/2}$
2592.424	2	38562.40	$62062^{\circ}_{9/2}-100625_{11/2}$	2495.584	2	40058.70	$67240^{\circ}_{7/2}-107299_{7/2}$
2590.248	3	38594.80	$64235^{\circ}_{9/2}-102830_{9/2}$	2495.508	10	40059.92	$61605^{\circ}_{7/2}-101665_{5/2}$
2589.900	4	38599.98	$65295^{\circ}_{7/2}-103895_{7/2}$	2493.685	6	40089.20	$61357^{\circ}_{9/2}-101446_{7/2}$
2584.766	3	38676.65	$65922^{\circ}_{11/2}-104598_{13/2}$	2491.326	6	40127.16	$63768^{\circ}_{7/2}-103895_{7/2}$
2582.712	1	38707.40	$68374^{\circ}_{9/2}-107081_{9/2}$	2487.750	6	40184.84	$68374^{\circ}_{9/2}-108559_{11/2}$
2577.866	2	38780.16	$67965^{\circ}_{3/2}-106745_{5/2}$	2482.577	1	40268.57	$60520^{\circ}_{7/2}-100788_{7/2}$
2576.922	3	38794.37	$67870^{\circ}_{9/2}-106665_{7/2}$	2480.487	9	40302.49	$63593^{\circ}_{9/2}-103895_{7/2}$
2576.109	1	38806.61	$68492^{\circ}_{7/2}-107299_{7/2}$	2475.946	1	40376.40	$62240^{\circ}_{11/2}-102617_{11/2}$
2574.917	7	38824.58	$61605^{\circ}_{7/2}-100430_{9/2}$	2474.320	1	40402.94	$44903_{5/2}-85306^{\circ}_{5/2}$
2572.074	1	38867.49	$68987^{\circ}_{7/2}-107854_{9/2}$	2472.376	5	40434.70	$38701_{13/2}-79136^{\circ}_{13/2}$
2570.170	4	38896.28	$66735^{\circ}_{13/2}-105632_{13/2}$	2469.796	1	40476.94	$35137_{3/2}-75614^{\circ}_{5/2}$
2565.796	1	38962.58	$36652_{5/2}-75614^{\circ}_{5/2}$	2465.272	2	40551.21	$60520^{\circ}_{7/2}-101071_{5/2}$
2565.346	1	38969.42	$36670_{11/2}-75640^{\circ}_{11/2}$	2462.895	10	40590.35	$35024_{7/2}-75614^{\circ}_{5/2}$

TABLE I. *Newly classified lines of* Pr III, λ >*2103Å*—Continued

λ_{air} Å	Intensity	σ (cm⁻¹)	Classification	λ_{air} Å	Intensity	σ (cm⁻¹)	Classification
2460.719	10	40626.24	$44679_{7/2}-85306^{\circ}_{5/2}$	2320.906	2	43073.39	$62558^{\circ}_{11/2}-105632_{13/2}$
2451.381	2	40780.98	$60166^{\circ}_{9/2}-100947_{9/2}$	2317.199	9	43142.29	$60166^{\circ}_{9/2}-103308_{7/2}$
2449.908	4	40805.50	$62678^{\circ}_{13/2}-103484_{15/2}$	2315.774	2	43168.84	$60166^{\circ}_{9/2}-103335_{9/2}$
2449.636	1	40810.03	$37011_{5/2}-77822^{\circ}_{5/2}$	2310.248	3	43272.09	$58174^{\circ}_{9/2}-101446_{7/2}$
2442.697	1	40925.95	$60520^{\circ}_{7/2}-101446_{7/2}$	2309.386	1	43288.24	$58158^{\circ}_{7/2}-101446_{7/2}$
2432.678	7	41094.49	$34520_{5/2}-75614^{\circ}_{5/2}$	2308.670	5	43301.66	$34520_{5/2}-77822^{\circ}_{5/2}$
2431.260	8	41118.46	$29263_{13/2}-70381^{\circ}_{13/2}$	2307.384	6	43325.79	$62240^{\circ}_{11/2}-105566_{9/2}$
2423.700	3	41246.71	$62558^{\circ}_{11/2}-103805_{13/2}$	2307.277	2	43327.80	$40098_{5/2}-83426^{\circ}_{5/2}$
2422.883	6	41260.61	$60419^{\circ}_{11/2}-101680_{13/2}$	2304.201	6	43385.64	$60419^{\circ}_{11/2}-103805_{13/2}$
2416.527	1	41369.13	$65295^{\circ}_{7/2}-106665_{7/2}$	2303.121	7	43405.98	$41023_{7/2}-84430^{\circ}_{7/2}$
2384.757	5	41920.21	$62678^{\circ}_{13/2}-104598_{13/2}$	2296.541	2	43530.34	$63768^{\circ}_{7/2}-107299_{7/2}$
2382.979	3	41951.49	$61357^{\circ}_{9/2}-103308_{7/2}$	2295.856	4	43543.32	$29835_{9/2}-73378^{\circ}_{7/2}$
2382.588	6	41958.37	$35863_{3/2}-77822^{\circ}_{5/2}$	2287.502	2	43702.33	$64857^{\circ}_{9/2}-108559_{11/2}$
2380.051	4	42003.09	$65295^{\circ}_{7/2}-107299_{7/2}$	2261.530	6	44204.17	$40205_{3/2}-84409^{\circ}_{3/2}$
2378.867	6	42024.00	$36670_{11/2}-78694^{\circ}_{11/2}$	2257.546	4	44282.17	$41023_{7/2}-85306^{\circ}_{5/2}$
2369.081	10	42197.57	$60419^{\circ}_{11/2}-102617_{11/2}$	2257.342	5*w*	44286.18	$26095_{11/2}-70381^{\circ}_{13/2}$
2367.497	3	42225.80	$62678^{\circ}_{13/2}-104904_{11/2}$	2251.445	8	44402.16	$25979_{15/2}-70381^{\circ}_{13/2}$
2365.796	8	42256.16	$58174^{\circ}_{9/2}-100430_{9/2}$	2243.485	1*w*	44559.69	$39870_{9/2}-84430^{\circ}_{7/2}$
2360.786	5	42345.83	$62558^{\circ}_{11/2}-104904_{11/2}$	2238.560	6	44657.71	$28720_{9/2}-73378^{\circ}_{7/2}$
2357.627	3	42402.56	$41023_{7/2}-83426^{\circ}_{5/2}$	2227.201	3	44885.45	$28720_{9/2}-73606^{\circ}_{9/2}$
2357.176	3	42410.67	$60419^{\circ}_{11/2}-102830_{9/2}$	2211.332	1	45207.52	$40098_{5/2}-85306^{\circ}_{5/2}$
2354.942	6	42450.90	$58174^{\circ}_{9/2}-100625_{11/2}$	2208.939	6	45256.49	$30505_{11/2}-75762^{\circ}_{9/2}$
2354.128	2	42465.58	$36670_{11/2}-79136^{\circ}_{13/2}$	2201.678	7*w*	45405.73	$39024_{9/2}-84430^{\circ}_{7/2}$
2353.942	6	42450.90	$60166^{\circ}_{9/2}-102617_{11/2}$	2196.775	7	45507.06	$37919_{7/2}-83426^{\circ}_{5/2}$
2345.001	4	42630.85	$58158^{\circ}_{7/2}-100788_{7/2}$	2176.676	3	45927.22	$29835_{9/2}-75762^{\circ}_{9/2}$
2337.295	2	42771.39	$62678^{\circ}_{13/2}-105450_{11/2}$	2162.611	2	46225.88	$27380_{11/2}-73606^{\circ}_{9/2}$
2335.873	6	42797.43	$35024_{7/2}-77822^{\circ}_{5/2}$	2155.562	5	46377.03	$29263_{13/2}-75640^{\circ}_{11/2}$
2332.129	1	42866.12	$35828_{9/2}-78694^{\circ}_{11/2}$	2148.203	1	46535.89	$23442_{11/2}-69978^{\circ}_{11/2}$
2330.393	6	42898.06	$64401^{\circ}_{5/2}-107299_{7/2}$	2135.942	2	46802.99	$23175_{13/2}-69978^{\circ}_{11/2}$
2329.568	7	42913.25	$58158^{\circ}_{7/2}-101071_{5/2}$				
2329.456	2	42915.31	$60419^{\circ}_{11/2}-103335_{9/2}$				
2325.016	2	42997.26	$64857^{\circ}_{9/2}-107854_{9/2}$				
2324.807	1	43001.12	$27380_{11/2}-70381^{\circ}_{13/2}$				
2324.438	7	43007.95	$62558^{\circ}_{11/2}-105566_{9/2}$				
2321.717	5	43058.35	$28936_{3/2}-71994^{\circ}_{5/2}$				

3. New Energy Levels

The techniques for using electronic computers in the search for energy levels are now well-known. The method [9] by which the line-list is added to (or subtracted from) the known levels to obtain statistically significant numbers of repeating sums (or differences) was used here. The selection of real levels is based on the probability of the occurrence of a chain of repeating sums of a particular length and tolerance as well as the line intensity distribution in the chain. This method yields many energy levels, but there always remain a certain number which make few combinations (particularly levels of high *J*-value) and which must be sought by intensity criteria alone according to the appropriate selection rules, and predicted positions.

Most of the observed lines of Pr III with moderate to strong intensity in the vacuum ultraviolet range are due to transitions to the $4f^25d$ configuration. The highest density of lines occurs between 1000 and 1200 Å, the main region of the $4f^25d$—$4f^25f$ transition array. This is analogous to Ce III where the same region contained the $4f5d$—$4f5f$ array [3]. In both cases, the array is well isolated and easily accessible, so that a thorough description of it can be obtained. With these lines 74 levels of the $4f^25f$ configuration were found.

Designations in *LS*-coupling were assigned to these levels on the basis of relative line intensities. Although final designations are given in the J_1l scheme in

table II, the experimentally derived LS names were important in relating the theoretical calculation of this configuration to the observed levels. The calculated LS composition, while showing less purity than J_1l, gave single designations for many levels exceeding 50 percent. The largest LS component for each level has been included in table VI.

A second region of high line-density appears from the beginning of table X to about 1800 Å. This is the short wavelength end of the $4f^25d$—$(4f^26p+5d^24f)$ transition array, which extends to about 2700 Å. Many of these lines were classified with the previously known levels. The tail of this array reaches to much shorter wavelengths due to the high-lying levels of $5d^24f$.

An extension of the high-level structure of even parity was made by using the longer wavelength line-list of reference 1. By combining these lines with the $4f^26p$ levels, more levels in the region of the previously identified $4f^26d$ group were found. Calculations of the structure of the configurations $4f^26d$ and $4f^27s$ provided the means to distinguish the latter configuration from among these levels.

Several low levels of the $4f^28s$ configuration were found by adding the vacuum ultraviolet lines to the $4f^26p$ levels. They were identified by their predicted location (compared with Ce III, $4f8s$), by their strong combinations with particular core terms of $4f^26p$, and by reasonable fitted values of the parameters $G^3(fs)$, $\zeta(4f)$ and $E^3(f^2)$.

A detailed investigation of the hfs of the $4f^26s$ configuration has been carried out by J. Reader and J. Sugar [10]. A by-product of this work was the discovery of the pair of levels based on the $4f^2(^3P_2)$ parent and the replacement of the level $\langle 4f^2(^1D_2), 6s, 5/2\rangle$.

The newly derived energy levels of Pr III are given in table II. Their designations result from calculations of the configurations in the purest coupling schemes, with radial parameters obtained by least squares fitting of linear energy formulas to the observed energy levels [11]. The results of these calculations are given in the sections which follow.

Designations of levels of the $4f^25f$, $5d^24f$, and $4f5d6s$ configurations in the LS-coupling scheme were made on the basis of relative strengths of the combinations with the $4f^25d$ terms. Later calculations of energy levels in this coupling scheme substantiated these assignments where the purity of the eigenvectors indicated a major LS component for a level. The successful correlation of observed and calculated energy levels was largely due to these experimental LS assignments.

The $4f^26d$, $4f^27s$, and $4f^28s$ levels were designated in J_1j-coupling according to the intensities of combinations with levels of $4f^26p$. In these transition arrays the selection rules $\Delta L_1=0$, $\Delta S_1=0$, and $\Delta J_1=0$ on parent levels are strongly obeyed. The J_1j-coupling designations given in table II for these configurations and for $4f^26s$ and $4f^26p$ contain the $4f^2$ core level and the j-value of the outer electron.

TABLE II. *New energy levels of* Pr III

Configuration	Designation	J	Energy/hc (cm^{-1})
$4f^26s$	$(^1D_2)1/2$	2½	[a]45807.1
	$(^3P_1)1/2$	0½	50869.3
	$(^3P_2)1/2$	2½	51312.8
	$(^3P_2)1/2$	1½	52026.9
$5d^24f$	$(^3F)^2I°$	5½	68238.12
	$(^3F)^4I°$	7½	68305.1
	$(^1D)^2H°$	5½	69408.51
	$(^3P)^4G°$	2½	69681.6
	$(^3F)^4G°$	5½	69978.08
	$(^3F)^2I°$	6½	70381.48
	$(^3P)^4G°$	4½	71021.1
	$(^3P)^4G°$	3½	71385.6
	$(^3P)^2D°$	1½	71501.0
	$(^1D)^2D°$	2½	71994.81
	$(^1G)^2H°$	4½	73029.9
	$(^1G)^2G°$	3½	73378.42
	$(^1D)^2G°$	4½	73606.17
	$(^3P)^4G°$	5½	73609.1
	$(^3P)^4D°$	2½	74105.2
	$(^3P)^4F°$	1½	74463.7
	$(^3P)^4F°$	3½	75294.0
$4f^26p$	$(^1D_2)1/2°$	2½	75614.81
$5d^24f$	$(^3F)^2H°$	5½	75640.00
	$(^1G)^2G°$	4½	75762.23
	$(^3F)^2D°$	1½	76892.4
	$(^1G)^2F°$	2½	77822.00
	$(^1G)^2F°$	3½	78463.6
	$(^1G)^2I°$	5½	78694.57
	$(^1G)^2I°$	6½	79136.23
$4f^26p$	$(^1D_2)3/2°$	2½	79366.65
$5d^24f$	$(^1G)^2D°$	1½	82492.4
$4f^26p$	$(^3P_1)3/2°$	2½	83426.55
	$(^3P_1)3/2°$	1½	84409.93
	$(^3P_2)3/2°$	3½	84430.98
	$(^3P_2)3/2°$	2½	85306.10
$4f5d6s$	$(^3G)^4G°$	3½	87511.6
	$(^3G)^4G°$	4½	88220.2
	$(^3F)^4F°$	4½	88948.6
	$(^3G)^4G°$	5½	90119.8
	$(^3H)^2H°$	4½	90629.2
	$(^3G)^2G°$	3½	92441.7
$5d^24f$	$(^1S)^2F°$	2½	92554.8
$4f5d6s$	$(^3H)^2H°$	5½	93296.5
$5d^24f$	$(^1S)^2F°$	3½	93967.4
$4f5d6s$	$(^3G)^2G°$	4½	95147.9
	$(^1F)^2F°$	3½	96830.5
$4f^26d$	$(^3H_4)3/2$	4½	100430.29
	$(^3H_4)3/2$	5½	100625.04
	$(^3H_4)3/2$	3½	100788.95
	$(^3H_4)5/2$	4½	100947.18
	$(^3H_4)3/2$	2½	101071.43
	$(^3H_4)5/2$	3½	101446.27
	$(^3H_4)5/2$	2½	101665.58
	$(^3H_4)5/2$	6½	101680.38
	$(^3H_5)3/2$	5½	102617.24
	$(^3H_5)3/2$	4½	102830.43
	$(^3H_5)3/2$	3½	103308.53
	$(^3H_5)5/2$	4½	103335.06
	$(^3H_5)5/2$	7½	103484.19
	$(^3H_5)5/2$	6½	103805.38
	$(^3H_5)5/2$	3½	103895.83

TABLE II. *New energy levels of* Pr III – Continued

Configuration	Designation	J	Energy/hc (cm^{-1})
$4f^27s$	$({}^3H_6)1/2$	$6\frac{1}{2}$	104598.99
$4f^26d$	$({}^3H_6)3/2$	$5\frac{1}{2}$	104904.55
	$({}^3H_6)5/2$	$5\frac{1}{2}$	105450.18
	$({}^3H_6)3/2$	$4\frac{1}{2}$	105566.62
	$({}^3H_6)5/2$	$6\frac{1}{2}$	105632.16
$4f^27s$	$({}^3F_3)1/2$	$3\frac{1}{2}$	106665.07
	$({}^3F_3)1/2$	$2\frac{1}{2}$	106745.65
	$({}^3F_4)1/2$	$4\frac{1}{2}$	107081.94
$4f^26d$	$({}^3F_3)3/2$	$3\frac{1}{2}$	107299.07
	$({}^3F_4)3/2$	$4\frac{1}{2}$	107854.46
	$({}^3F_4)5/2$	$5\frac{1}{2}$	108559.40
$4f^25f$	$({}^3H_4)[6]^\circ$	$5\frac{1}{2}$	110295.1
	$[4]^\circ$	$3\frac{1}{2}$	110333.5
	$[7]^\circ$	$6\frac{1}{2}$	110530.9
	$[5]^\circ$	$5\frac{1}{2}$	110881.1
	$[4]^\circ$	$4\frac{1}{2}$	110922.5
	$[6]^\circ$	$6\frac{1}{2}$	111110.3
	$[2]^\circ$	$1\frac{1}{2}$	111268.7
	$[7]^\circ$	$7\frac{1}{2}$	111335.1
	$[3]^\circ$	$3\frac{1}{2}$	111342.8
	$[2]^\circ$	$2\frac{1}{2}$	111494.8
	$[5]^\circ$	$4\frac{1}{2}$	111993.0
	$({}^3H_5)[5]^\circ$	$5\frac{1}{2}$	112643.2
	$[7]^\circ$	$6\frac{1}{2}$	112769.7
	$[7]^\circ$	$7\frac{1}{2}$	112896.3
	$[8]^\circ$	$8\frac{1}{2}$	113023.5
	$[5]^\circ$	$4\frac{1}{2}$	113158.8
	$[4]^\circ$	$3\frac{1}{2}$	113291.8
	$[3]^\circ$	$2\frac{1}{2}$	113556.8
	$[6]^\circ$	$6\frac{1}{2}$	113600.3
	$[3]^\circ$	$3\frac{1}{2}$	113630.9
	$[6]^\circ$	$5\frac{1}{2}$	113664.3
	$[4]^\circ$	$4\frac{1}{2}$	113780.5
	$[2]^\circ$	$1\frac{1}{2}$	113825.5
	$[8]^\circ$	$7\frac{1}{2}$	113833.9
	$[2]^\circ$	$2\frac{1}{2}$	113914.1
	$({}^3H_6)[8]^\circ$	$8\frac{1}{2}$	114725.6
	$[6]^\circ$	$6\frac{1}{2}$	114797.2
	$[9]^\circ$	$9\frac{1}{2}$	114970.7
	$[4]^\circ$	$4\frac{1}{2}$	115324.3
	$[6]^\circ$	$5\frac{1}{2}$	115403.3
	$[7]^\circ$	$6\frac{1}{2}$	115408.4
	$[3]^\circ$	$3\frac{1}{2}$	115420.8
	$[5]^\circ$	$4\frac{1}{2}$	115499.8
	$({}^3F_2)[4]^\circ$	$3\frac{1}{2}$	115670.0
	$({}^3H_6)[8]^\circ$	$7\frac{1}{2}$	115672.2
	$[3]^\circ$	$2\frac{1}{2}$	115800.0
	$[5]^\circ$	$5\frac{1}{2}$	115933.2
	$[4]^\circ$	$3\frac{1}{2}$	116021.8
	$[7]^\circ$	$7\frac{1}{2}$	116238.8
	$({}^3F_2)[5]^\circ$	$5\frac{1}{2}$	116309.2
	$[4]^\circ$	$4\frac{1}{2}$	116453.2
	$({}^3H_6)[9]^\circ$	$8\frac{1}{2}$	116489.8
	$({}^3F_2)[3]^\circ$	$2\frac{1}{2}$	116727.1
	$[3]^\circ$	$3\frac{1}{2}$	117044.6
	$({}^3F_3)[6]^\circ$	$6\frac{1}{2}$	117248.2
	$[6]^\circ$	$5\frac{1}{2}$	117323.1
	$[1]^\circ$	$1\frac{1}{2}$	117540.5
	$[5]^\circ$	$5\frac{1}{2}$	117574.5
	$[4]^\circ$	$3\frac{1}{2}$	117647.2
	$[3]^\circ$	$2\frac{1}{2}$	117686.4
	$({}^3F_4)[6]^\circ$	$6\frac{1}{2}$	117775.3
	$[7]^\circ$	$7\frac{1}{2}$	118063.0
	$({}^3F_3)[4]^\circ$	$4\frac{1}{2}$	118081.1
	$[2]^\circ$	$1\frac{1}{2}$	118201.4
	$({}^3F_4)[5]^\circ$	$5\frac{1}{2}$	118271.6
	$({}^3F_3)[3]^\circ$	$3\frac{1}{2}$	118318.6
	$({}^3H_4)[5]^\circ$	$4\frac{1}{2}$	118468.8
	$[7]^\circ$	$6\frac{1}{2}$	118610.9
	$[5]^\circ$	$5\frac{1}{2}$	118879.3
	$({}^1G_4)[6]^\circ$	$6\frac{1}{2}$	120498.7
	$[5]^\circ$	$5\frac{1}{2}$	121095.2
	$[7]^\circ$	$7\frac{1}{2}$	121119.2
	$[5]^\circ$	$4\frac{1}{2}$	121382.6
	$[7]^\circ$	$6\frac{1}{2}$	121431.2
	$[6]^\circ$	$5\frac{1}{2}$	121532.5
	$({}^1D_2)[1]^\circ$	$1\frac{1}{2}$	128214.2
	$[5]^\circ$	$4\frac{1}{2}$	128352.8
	$[5]^\circ$	$5\frac{1}{2}$	128381.6
	$[4]^\circ$	$3\frac{1}{2}$	128453.2
	$[4]^\circ$	$4\frac{1}{2}$	128568.6
	$({}^1I_6)[9]^\circ$	$8\frac{1}{2}$	133194.3
	$[9]^\circ$	$9\frac{1}{2}$	133242.3
	$[8]^\circ$	$7\frac{1}{2}$	133352.2
	$[8]^\circ$	$8\frac{1}{2}$	133373.0
$4f^28s$	$({}^3H_4)1/2$	$4\frac{1}{2}$	129106.1
	$({}^3H_5)1/2$	$5\frac{1}{2}$	131200.3
	$({}^3H_5)1/2$	$4\frac{1}{2}$	131226.3
	$({}^3H_6)1/2$	$6\frac{1}{2}$	133393.2
	$({}^3H_6)1/2$	$5\frac{1}{2}$	133503.9
	$({}^3F_3)1/2$	$3\frac{1}{2}$	135445.2
	$({}^3F_4)1/2$	$4\frac{1}{2}$	135868.8

[a] Level values are given to two decimal places when derived from wavelengths > 2100 Å having no hfs.

4. Theoretical Interpretation of the Observed Configurations

For the calculation and diagonalization of energy matrices, computer programs written by Y. Bordarier and A. Carlier at Laboratoire Aimé Cotton, Orsay, France, were used. These programs evaluate the energy formulas given in terms of nj-coefficients, and compiled the output in the form of J-matrices which may then be diagonalized. The large library of matrices assembled at Hebrew University by G. Racah and his co-workers was made available to us by Z. Goldschmit, and is compatible with the above-mentioned programs.

The matrix library tape contains the configurations f^2p and $f(d+s)^2$. For the present work they were combined with configuration interaction (utilizing the formulas for three-electron matrix elements calculated by Fano, Pratts, and Goldschmidt [12]) to study the configuration complex $4f^26p+5d^24f+4f5d6s$. The matrices of $f^2(d+s)$ are also on the library tape, and were used in the study of $4f^26d$, $4f^27s$, and $4f^28s$. The matrices of f^2f' were calculated manually by means of the Racah formalism [13] prior to the acquisition of these programs.

In the present paper, unreduced values for the Slater parameters are used. The convention of multiplying the coefficient martices by arbitrary factors to simplify denominators is unnecessary for computer calculations.

The notations for the parameters in tables III, V, VII, and IX have the following meaning: "A" is an additive constant common to all levels of the configuration; $F^k(l, l')$ and $G^k(l, l')$ are the Slater radial integrals arising from the electrostatic interaction between the electrons l and l'; ζ_l is the parameter of the spin-orbit

TABLE III. *Fitted parameter values and associated standard errors for the* $4f^26p+5d^24f+4f5d6s$ *configurations of* Pr III *and corresponding parameters of* Ce III *and* Pr IV *in units of* cm^{-1}

Parameters	Pr III	Ce III	Pr IV
	$4f^26p$	$4f6p$	$4f^2$
A	67903 ± 90	52001 ± 62	
$E^1(f^2)$	4984 ± 25		5011 ± 17
E^2	23.1 ± 0.2		23.1 ± 0.1
E^3	486 ± 2		488 ± 1
α	28 ± 2		24 ± 1
γ	−50 ± 9		−49 ± 6
$F^2(fp)$	6075 ± 225	5400 ± 450	
G^2	1785 ± 140	2450 ± 875	
G^4	1531 ± 302	945 ± 284	
ζ_p	2338 ± 24	2155 ± 33	
ζ_f	751 ± 10	644 ± 10	760 ± 6
	$5d^24f$	$5d^2$	
A	73137 ± 48	46027 ± 67	
$B(d^2)$	406 ± 5	442 ± 3	
C	2021 ± 21	2006 ± 111	
$F^2(fd)$	21000 ± 284		
F^4	15385 ± 431		
G^1	10080 ± 96		
G^3	13954 ± 665		
G^5	10825 ± 611		
ζ_d	946 ± 23	837 ± 14	
ζ_f	838 ± 19		
E_s	483 ± 55		
	$4f5d6s$	$5d6s$	
A	92316 ± 156	66388 ± 96	
$F^2(fd)$	20790 ± 1050		
F^4	15177 Fixed F^2/F^4		
G^1	9905 ± 476		
G^3	13167 Fixed G^1/G^3		
G^5	10825 Fixed G^1/G^5		
$G^2(ds)$	10125 ± 410	11125 ± 705	
$G^3(fs)$	2100 Fixed		
ζ_d	1035 ± 66	927 ± 28	
ζ_f	838 Fixed		
Configuration interaction			
$R^1(fp,d^2)$	−1583 ± 122	3115 ± 105	
$R^3(fp,d^2)$	1655 ± 308	0 Fixed	
$R^1(fp,ds)$	6590 ± 341	5355 ± 730	
$R^3(fp,sd)$	0 Fixed	0 Fixed	
$R^2(dd,ds)$	16940 ± 621	15820 ± 1295	
$R^2(fd,fs)$	0 Fixed		
$R^3(fd,sf)$	0 Fixed		
rms error in calculated levels	89 cm^{-1}	47 cm^{-1}	

interaction for the electron l; E^1, E^2, and E^3 are linear combinations of the Slater radial integrals defined by Racah [14] which arise from the electrostatic interaction within an f^n shell; B and C are linear combinations of Slater integrals defined by Racah [13] for the d^n shell; α and γ are two-body effective interaction parameters acting within the f^n shell which have the coefficients $L(L+1)$ and $12g(U)$, respectively, where L refers to the orbital angular momentum in the f^n shell and $g(U)$ are the eigenvalues of the Casimir operator $G(G_2)$ tabulated by Racah [14]; E_s is the two-body effective interaction parameter for nonequivalent electrons proposed by Sack [20] and is used here for the $5d^24f$ configuration; R^k are the radial integrals arising from configuration interaction.

4.1. The $4f^26p+5d^24f+4f5d6s$ Complex

These three configurations are analogous to the Ce III group $4f6p$, $5d^2$, and $5d6s$ treated theoretically by Z. Goldschmidt [15]. She found strong mutual perturbations in Ce III, reporting large mixutres of terms of two configurations in several levels. This accounts for the poor results of Spector's calculation of $4f6p$ alone [16]. The rms error in his calculated levels is 394 cm^{-1}, while that obtained in reference 15 for the mixture of the three configurations is 47 cm^{-1}.

Following the results in Ce III, I have treated the mixed complex of configurations $4f^26p$, $5d^24f$, and $4f5d6s$ in Pr III. Initial parameters for the first diagonalization of the energy matrices were obtained from the following sources for the $5d^24f$ and $4f5d6s$ configurations:

Interaction	Source	Reference
$d-d$	Ce III $5d^2$	15
$d-s$	Ce III $5d6s$	15
$f-s$	Pr III $4f^26s$	19
$d-f$	Pr III $4f^25d$	17
$\zeta_d(5d^2)$	Ce III $5d^2$	15
$\zeta_d(5d)$	Ce III $5d6s$	15
ζ_f	Pr IV $4f6s$	18

The matrices for these configurations were diagonalized without configuration interaction to determine the correspondence with the observed levels. This was accomplished by means of the experimentally identified LS composition of many of the levels. The parameters were then improved by least squares adjustment to fit the observed levels and further improved by several repetitions of these steps. Because of the small number of known levels of $4f5d6s$, fixed ratios were assumed for F^2/F^4, G^1/G^3, and G^1/G^5 of the $f-d$ interaction as well as fixed values of $G^3(f,s)$ and ζ_f. The refined parameter values then served as initial parameters for the first diagonalization with configuration interaction.

Spector has treated the $4f^26p$ configuration of Pr III theoretically [19] and obtained an rms error of 198 cm^{-1} for his calculated levels. His results served here for initial parameters of this configuration.

Initial values for the configuration interaction parameters $R^1(fp,d^2)$ between $4f^26p$ and $5d^24f$, $R^1(fp,ds)$ between $4f^26p$ and $4f5d6s$, and $R^2(d^2,ds)$ between $5d^24f$ and $4f5d6s$ were taken from the Ce III results [15]. All other configuration interaction parameters were initially set equal to zero.

Several sequences of diagonalization and adjustment of the parameters were carried out to obtain conver-

gence before attempting to evaluate the less sensitive interaction parameters. Then the parameters $R^2(fd,fs)$ and $R^3(fd,sf)$ which act between the $5d^24f$ and $4f5d6s$ configurations, and $G^3(fs)$ of the latter configuration were added. These were found to be undefinable in the least squares calculations (their standard errors exceeded their values) because too few levels of $4f5d6s$ are known. They were therefore fixed at the following values:

$$R^2(fd,fs)=R^3(fd,sf)=0$$
$$G^3(fs)\qquad =2100\ \mathrm{cm}^{-1}.$$

Finally, values for $R^3(fp,d^2)$ and $R^3(fp,sd)$ were sought. The latter was undefinable and was therefore fixed at zero. The iterative fitting procedure was again brought to convergence, with an rms error of 119 cm^{-1} for the calculated levels.

Goldschmidt's success in utilizing the Sack [20] effective two-body interaction operators $E_lL(L+1)$ and $E_sS(S+1)$ acting on the final L and S of the levels of $4f5d$ in Ce III [15] suggested their use for the $4f^26p$ and $5d^24f$ configurations of Pr III. For these configurations, following Sack, the operators are $E_l[L(L+1)-L_c(L_c+1)]$ and $E_s[S(S+1)-S_c(S_c+1)]$, where L_c and S_c refer to the $4f^2$ or $5d^2$ core terms. A well defined value was obtained only for E_s of $5d^24f$. The addition of this parameter reduced the rms error to its final value of 89 cm^{-1}.

In table III the final values for the parameters derived from the mixing of the three configurations are given. In all least squares calculations the ratios F^2/F^4, G^1/G^3, and G^1/G^5 of the $4f5d6s$ configuration were fixed at the values taken by the corresponding parameters of $5d^24f$ in the preceding calculation. Also the parameter ζ_f of $4f5d6s$ was required to be equal to ζ_f in $5d^24f$. The remaining free parameters common to these two configurations, namely F^2, G^1, and ζ_d, took nearly equal values in both configurations. It is interesting to note that they are nearly equal to the corresponding parameters of the $4f5d$ configuration [18] of Pr IV.

Included in table III are the corresponding parameters of Ce III evaluated by Goldschmidt [15] and the parameters of the $4f^2$ configuration of Pr IV [21] included for comparison with $4f^26p$ core interactions.

Table IV contains all the calculated levels of the three configurations, all the experimental levels assigned to these configurations, and the squares of the components of the eigenvectors of the calculated levels (their percentage composition). A maximum of three components is given for each level, but less are shown when the sum represents 90 percent or more of the composition. Where a level contains 20 percent or more of the eigenvectors of two configurations, both are indicated in the column labeled "configuration" by means of an "X".

The highest purity of eigenvectors for $4f^26p$ is of course obtained in J_1j-coupling because of the large value of ζ_p and the small electrostatic interaction between the f and p electrons. The designation of the energy levels in this scheme gives the $4f^2$ core level in parentheses followed by the j of the $6p$ electron (1/2 or 3/2).

The coupling is much less pure in $5d^24f$. Here the electrostatic interactions within the $5d^2$ shell and between $5d$ and $4f$ are both strong. Therefore, no preferred order of coupling of electrons occurs. The basis states are calculated in an LS scheme in which the d electrons are first coupled and the f electron is then added. In table IV the $5d^2$ core term is given in parentheses followed by the final LS term. The large values of $\zeta(5d)$ and $\zeta(4f)$ give rise to intermediate coupling. I transformed the eigenvectors to the $(d^2)J_1(f)j$ scheme and found higher purity for a few levels, but the average purity for the configuration is lower than in the LS scheme.

TABLE IV. *Calculated energy levels and compositions of the mixed* 4f²6p, 5d²4f, *and* 4f5d6s *configurations of* Pr III.

The $4f^26p$ levels are designated in J_1j-coupling. The levels of $5d^24f$ and $4f5d6s$ are designated in LS-coupling, with those of $4f5d6s$ distinguished by the symbol *. Levels attributed to two configurations contain 20 percent or more of each

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus calc.	Configuration			Composition					
				$4f^26p$	$5d^24f$	$4f5d6s$						
$0\frac{1}{2}$	63030				X		$(^3F)^2S$	31%,	$(^3F)^4D$	23%,	$(^3F)^2P$	19%
	64988				X		$(^3F)^2S$	41%,	$(^3F)^4D$	30%,	$(^3F_2)3/2$	11%
	66481	66325	−156	X			$(^3F_2)3/2$	81%,	$(^3F)^2S$	4%,	$(^3F)^4D$	3%
	68973				X		$(^1D)^2P$	31%,	$(^3F)^2P$	24%,	$(^3F)^4D$	23%
	70262				X		$(^3F)^4P$	74%,	$(^3F)^2S$	19%,		
	72188				X		$(^3P)^4D$	62%,	$(^3F)^2P$	13%,	$(^3F)^4D$	12%
	74970				X		$(^3F)^2P$	37%,	$(^1D)^2P$	30%,	$(^3P)^4D$	18%
	78311	78313	2	X			$(^1D_2)3/2$	68%,	$(^3P_2)3/2$	11%,	$(^3P_0)1/2$	9%
	79409			X			$(^3P_0)1/2$	72%,	$(^1D_2)3/2$	16%		
	79703	79742	39	X			$(^3P_1)1/2$	79%,	$(^3P_0)1/2$	12%		
	83375			X			$(^3P_1)3/2$	51%,	$(^3P_2)3/2$	35%,	$*(^3P)^4P$	6%
	84984			X			$(^3P_2)3/2$	47%,	$(^3P_1)3/2$	37%,	$(^1G)^2P$	6%
	87650				X		$(^1G)^2P$	91%				
	89556					X	$*(^3D)^4D$	91%				
	92742					X	$*(^3P)^4P$	90%				
	97264					X	$*(^3P)^2P$	90%				
	101423					X	$*(^1P)^2P$	89%,	$(^1S_0)1/2$	5%		
	111001			X			$(^1S_0)1/2$	94%				

TABLE IV. *Calculated energy levels and compositions of the mixed* $4f^26p$, $5d^24f$, *and* $4f5d6s$ *configurations of* Pr III. – Continued

The $4f^26p$ levels are designated in Jj-coupling. The levels of $5d^24f$ and $4f5d6s$ are designated in LS-coupling, with those of $4f5d6s$ distinguished by the symbol *. Levels attributed to two configurations contain 20 percent or more of each

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus calc.	Configuration			Composition					
				$4f^26p$	$5d^24f$	$4f5d6s$						
$1\frac{1}{2}$	63142	63221	79	X			$(^3F_2)1/2$	91%				
	65166				X		$(^3F)^4D$	57%,	$(^3P)^4D$	13%,	$(^3F)^2P$	10%
	65639				X		$(^3F)^4F$	76%,	$(^3F_2)3/2$	10%,	$(^3P)^4F$	5%
	66828	66867	39	X			$(^3F_2)3/2$	76%,	$(^3F)^4F$	7%,	$(^3F)^4D$	5%
	67916	67965	49	X			$(^3F_3)3/2$	91%				
	68942				X		$(^3F)^2P$	41%,	$(^1D)^2P$	13%,	$(^3F)^4D$	10%
	69488				X		$(^3F)^4P$	82%,	$(^3F)^4S$	5%,	$(^3F)^2P$	5%
	70631				X		$(^1D)^2D$	44%,	$(^3F)^4S$	16%,	$(^1D)^2P$	14%
	71456	71501	45		X		$(^3P)^2D$	32%,	$(^3F)^4S$	25%,	$(^3P)^4D$	14%
	71988				X		$(^3F)^4S$	35%,	$(^3P)^2D$	17%,	$(^1D)^2D$	10%
	73947				X		$(^3P)^4F$	31%,	$(^3P)^4D$	27%,	$(^3F)^2D$	14%
	74066				X		$(^3P)^4D$	20%,	$(^3P)^2D$	18%,	$(^1D)^2P$	15%
	74509	74464	−45		X		$(^3P)^4F$	45%,	$(^3F)^2D$	26%,	$(^3F)^4F$	7%
	75415	75410	−5	X			$(^1D_2)1/2$	79%,	$(^3P_2)1/2$	8%,	$(^3F)^2D$	5%
	76826	76892	66		X		$(^3F)^2D$	30%,	$(^1D)^2P$	27%,	$(^3F)^2P$	15%
	78963	78889	−74	X			$(^1D_2)3/2$	76%,	$(^3P_2)3/2$	8%,	$(^3P_1)1/2$	4%
	80190	80164	−26	X			$(^3P_1)1/2$	88%,	$(^1D_2)3/2$	5%		
	80878	80898	20	X			$(^3P_2)1/2$	75%,	$(^1D_2)1/2$	7%,	$(^3P_0)3/2$	5%
	82573	82492	−81	X	X		$(^3P_0)3/2$	44%,	$(^1G)^2D$	35%,	$(^1G)^2P$	6%
	82926	83026	100	X			$(^3P_1)3/2$	43%,	$(^3P_0)3/2$	23%,	$(^1G)^2D$	12%
	84003			X		X	$(^3P_1)3/2$	31%,	$^*(^3F)^4F$	25%,	$(^1G)^2D$	15%
	84494	84410	−84		X		$^*(^3F)^4F$	62%,	$(^3P_1)3/2$	11%,	$(^1G)^2D$	8%
	85279			X			$(^3P_2)3/2$	65%,	$(^1G)^2P$	16%,	$(^1D_2)3/2$	5%
	87031				X		$(^1G)^2P$	62%,	$(^3P_2)3/2$	15%,	$(^1G)^2D$	13%
	89214					X	$^*(^1D)^2D$	40%,	$^*(^3D)^4D$	37%,	$^*(^3F)^4F$	7%
	90681					X	$^*(^3D)^4D$	52%,	$^*(^1D)^2D$	32%,	$^*(^3P)^4P$	4%
	92797					X	$^*(^3P)^4P$	76%,	$^*(^1P)^2P$	5%,	$^*(^3D)^4D$	4%
	95092					X	$^*(^3D)^2D$	76%,	$^*(^1D)^2D$	7%,	$(^1D)^2D$	6%
	96994					X	$^*(^3P)^2P$	67%,	$^*(^1P)^2P$	16%,	$^*(^3P)^4P$	5%
	103051					X	$^*(^1P)^2P$	70%,	$^*(^3P)^2P$	19%,	$(^1S_0)3/2$	3%
	114351			X			$(^1S_0)3/2$	96%				
$2\frac{1}{2}$	61698	61718	20	X			$(^3H_4)3/2$	72%,	$(^3F_2)1/2$	18%		
	63544	63576	32	X			$(^3F_2)1/2$	75%,	$(^3H_4)3/2$	20%		
	64396	64401	5	X			$(^3F_3)1/2$	75%,	$(^3F)^4D$	7%,	$(^3F)^2F$	6%
	64817	64818	1		X		$(^3F)^2F$	31%,	$(^3F)^4G$	27%,	$(^3F_3)1/2$	16%
	66014	65909	−105		X		$(^3F)^4G$	47%,	$(^3F)^4D$	18%,	$(^1D)^2F$	9%
	66571	66681	110	X	X		$(^3F)^4F$	52%,	$(^3F_2)3/2$	30%,	$(^3F_3)3/2$	5%
	66994	66943	−51		X		$(^3F)^4D$	24%,	$(^3F_2)3/2$	14%,	$(^3F)^2F$	11%
	67361	67395	34	X	X		$(^3F_2)3/2$	44%,	$(^3F)^4F$	22%,	$(^3F)^4D$	14%
	68288			X			$(^3F_3)3/2$	38%,	$(^3F_4)3/2$	30%,	$(^1G_4)3/2$	16%
	68991	68979	−12	X			$(^3F_3)3/2$	41%,	$(^3F_4)3/2$	35%,	$(^1G_4)3/2$	10%
	69359				X		$(^3F)^4P$	36%,	$(^3P)^2D$	22%,	$(^3F)^2D$	13%
	69572	69682	110		X		$(^3P)^4G$	83%,	$(^3F)^4P$	6%,	$(^3F)^4G$	5%
	70369				X		$(^3P)^2D$	46%,	$(^3F)^4P$	35%,	$(^3F)^4D$	7%
	71504	71536	32	X			$(^1G_4)3/2$	61%,	$(^3F_4)3/2$	28%,	$(^1D_2)1/2$	2%
	72007	71995	−12		X		$(^1D)^2D$	26%,	$(^3P)^4D$	17%,	$(^3F)^4P$	16%
	74168	74105	−63		X		$(^3P)^4D$	27%,	$(^3P)^4F$	23%,	$(^1D)^2F$	14%
	74744				X		$(^3P)^4F$	62%,	$(^3P)^4D$	12%,	$(^1D)^2F$	8%
	75354	75561	207		X		$(^3F)^2D$	35%,	$(^1D_2)1/2$	18%,	$(^1D)^2D$	14%
	75782	75615	−167	X			$(^1D_2)1/2$	60%,	$(^1D)^2D$	10%,	$(^3P_2)1/2$	6%
	76491				X		$(^3F)^2D$	27%,	$(^1D)^2F$	19%,	$(^3P)^2D$	12%
	77944	77822	−122		X		$(^1G)^2F$	70%,	$(^3F)^2F$	5%,	$(^1G)^2D$	4%
	79360	79367	7	X			$(^1D_2)3/2$	79%,	$(^3P_2)3/2$	7%,	$^*(^1D)^2D$	5%
	81472	81405	−67	X			$(^3P_2)1/2$	83%,	$(^1D_2)1/2$	8%		
	83359	83427	68	X			$(^3P_1)3/2$	79%,	$(^1G)^2D$	10%,	$^*(^3D)^4D$	3%
	84317			X	X		$(^1G)^2D$	43%,	$(^3P_2)3/2$	20%,	$(^3P_1)3/2$	10%
	84710				X		$(^3P)^2F$	52%,	$(^1S)^2F$	13%,	$(^1G)^2F$	9%
	84986					X	$^*(^3F)^4F$	56%,	$(^3P)^2F$	8%,	$(^3P_x)3/2$	7%
	85323	85306	−17	X			$(^3P_2)3/2$	52%,	$(^1G)^2D$	19%,	$^*(^3F)^4F$	9%
	85904					X	$^*(^3G)^4G$	87%,	$^*(^3F)^4F$	7%,		
	88297					X	$^*(^1D)^2D$	42%,	$^*(^3F)^4F$	18%,	$^*(^3F)^2F$	16%
	90038					X	$^*(^3F)^2F$	44%,	$^*(^3D)^4D$	24%,	$^*(^1D)^2D$	9%
	91295					X	$^*(^3D)^4D$	56%,	$^*(^1D)^2D$	11%,	$(^1S)^2F$	10%
	92422	92555	133		X		$(^1S)^2F$	54%,	$^*(^1F)^2F$	13%,	$(^3P)^2F$	11%
	94069					X	$^*(^3P)^4P$	69%,	$^*(^3D)^2D$	10%,	$(^3P_2)3/2$	3%
	94917					X	$^*(^1F)^2F$	50%,	$^*(^3D)^2D$	10%,	$^*(^3P)^4P$	10%
	97877					X	$^*(^3D)^2D$	62%,	$^*(^1F)^2F$	16%,	$^*(^1D)^2D$	9%

TABLE IV. *Calculated energy levels and compositions of the mixed* $4f^26p$, $5d^24f$, *and* $4f5d6s$ *configurations of* Pr III. — Continued

The $4f^26p$ levels are designated in Jj-coupling. The levels of $5d^25f$ and $4f5d6s$ are designated in LS-coupling, with those of $4f5d6s$ distinguished by the symbol *. Levels attributed to two configurations contain 20 percent or more of each

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus calc.	Configuration $4f^26p$	Configuration $5d^24f$	Configuration $4f5d6s$	Composition
$3\frac{1}{2}$	58164	58158	−6	X			$(^3H_4)1/2$ 82%, $(^3F)^4H$ 6%, $(^3H_4)3/2$ 4%
	60524	60520	−4		X		$(^3F)^4H$ 43%, $(^3F)^2G$ 33%, $(^3H_4)1/2$ 10%
	61560	61605	45	X			$(^3H_4)3/2$ 80%, $(^3F)^2G$ 7%, $(^1G^4)3/2$ 2%
	63260	63232	−28		X		$(^3F)^4H$ 42%, $(^3F)^2G$ 20%, $(^3F)^2F$ 7%
	63807	63769	−38	X			$(^3H_5)3/2$ 47%, $(^3F_3)1/2$ 34%, $(^3F)^4G$ 4%
	64992	64980	−12	X			$(^3F_4)1/2$ 46%, $(^1G_4)1/2$ 17%, $(^3F)^2G$ 8%
	65265	65296	31	X			$(^3F_3)1/2$ 45%, $(^3H_5)3/2$ 39%, $(^3F_4)1/2$ 6%
	65932	65935	3		X		$(^3F)^2F$ 22%, $(^3F)^4D$ 12%, $(^3F)^2G$ 9%
	66949	66853	−96		X		$(^3F)^4G$ 47%, $(^3F_2)3/2$ 18%, $(^3F)^4D$ 7%
	67280	67240	−40	X	X		$(^3F_2)3/2$ 58%, $(^3F)^4G$ 27%, $(^3F_3)3/2$ 2%
	67624	67679	55	X	X		$(^1G_4)1/2$ 32%, $(^3F)^4F$ 32%, $(^3F_4)1/2$ 9%
	68221	68332	111	X	X		$(^3F)^4F$ 22%, $(^3F_3)3/2$ 21%, $(^1G_4)1/2$ 18%
	68511	68492	−19	X			$(^3F_3)3/2$ 37%, $(^3F)^4F$ 17%, $(^3F_4)1/2$ 10%
	68789	68802	13	X			$(^3F_4)3/2$ 29%, $(^1G_4)3/2$ 23%, $(^3F_3)3/2$ 22%
	69184	68987	−197		X		$(^3F)^4D$ 19%, $(^3P)^4G$ 15%, $(^1D)^2G$ 14%
	69492	69431	−61		X		$(^3F)^4D$ 18%, $(^3P)^4G$ 17%, $(^1D)^2G$ 17%
	71450	71386	−64		X		$(^3P)^4G$ 58%, $(^1D)^2G$ 24%, $(^3P)^2G$ 7%
	72005	71979	−26	X			$(^1G_4)3/2$ 48%, $(^3F_4)3/2$ 38%, $(^1G)^2G$ 4%
	73316	73378	62		X		$(^1G)^2G$ 65%, $(^3P)^2G$ 9%, $(^1D)^2G$ 9%
	74550				X		$(^3P)^4D$ 62%, $(^3F)^4D$ 18%, $(^1D)^2F$ 10%
	75309	75294	−15		X		$(^3P)^4F$ 74%, $(^3P)^4D$ 7%, $(^3F)^2F$ 5%
	76550				X		$(^1D)^2F$ 46%, $(^3P)^4F$ 11%, $(^3F)^2F$ 10%
	78374	78463	89	X	X		$(^1G)^2F$ 58%, $(^1D_2)3/2$ 20%, $(^3P)^2F$ 5%
	79226	79396	170	X			$(^1D_2)3/2$ 66%, $(^1G)^2F$ 14%, $(^3P_2)3/2$ 7%
	81357				X		$(^3P)^2G$ 46%, $(^1G)^2G$ 21%, $(^1D)^2G$ 9%
	84135					X	$*(^3H)^4H$ 73%, $*(^1G)^2G$ 19%
	84418	84431	13	X			$(^3P_2)3/2$ 85%, $(^1D_2)3/2$ 9%
	85860				X		$(^3P)^2F$ 57%, $(^1G)^2F$ 11%, $(^3F)^2F$ 10%
	86122					X	$*(^1G)^2G$ 32%, $*(^3G)^4G$ 22%, $*(^3H)^4H$ 22%
	86381					X	$*(^3F)^4F$ 70%, $*(^3G)^4G$ 15%, $(^3P)^2F$ 4%
	87602	87512	−90			X	$*(^3G)^4G$ 52%, $*(^1G)^2G$ 26%, $*(^3F)^4F$ 11%
	90636					X	$*(^3D)^4D$ 32%, $*(^1F)^2F$ 29%, $*(^3F)^2F$ 24%
	92022					X	$*(^3F)^2F$ 35%, $*(^3D)^4D$ 32%, $*(^3G)^2G$ 15%
	92476	92442	−34			X	$*(^3G)^2G$ 53%, $*(^3D)^4D$ 21%, $*(^1G)^2G$ 10%
	94002	93967	−35		X		$(^1S)^2F$ 74%, $*(^3G)^2G$ 4%, $*(^3D)^4D$ 4%
	96948	96830	−118			X	$*(^1F)^2F$ 51%, $*(^3F)^2F$ 23%, $(^1D)^2F$ 8%
$4\frac{1}{2}$	58244	58174	−70	X			$(^3H_4)1/2$ 95%
	60160	60166	6	X			$(^3H_5)1/2$ 79%, $(^3H_4)3/2$ 7%, $(^3F)^4H$ 7%
	61332	61357	25	X			$(^3H_4)3/2$ 53%, $(^3F)^4I$ 19%, $(^3H_5)1/2$ 12%
	61971	62063	92	X	X		$(^3F)^4I$ 44%, $(^3H_4)3/2$ 32%, $(^3F)^2G$ 9%
	62508	62536	28		X		$(^3F)^2G$ 33%, $(^3F)^4H$ 27%, $(^3F)^4I$ 27%
	63560	63593	33	X	X		$(^3H_5)3/2$ 67%, $(^3F)^4H$ 11%, $(^3F)^2G$ 11%
	64271	64236	−35	X	X		$(^3F)^4H$ 46%, $(^3H_5)3/2$ 24%, $(^3F)^2G$ 19%
	64929	64857	−72	X			$(^3F_4)1/2$ 57%, $(^1G_4)1/2$ 24%, $(^3H_6)3/2$ 12%
	66953	67049	96	X			$(^3H_6)3/2$ 60%, $(^1G_4)1/2$ 12%, $(^1D)^2H$ 9%
	67412	67399	−13		X		$(^1D)^2H$ 29%, $(^3F)^2H$ 20%, $(^3H_6)3/2$ 13%
	67815	67871	56	X	X		$(^3F_3)3/2$ 48%, $(^3F)^4G$ 26%, $(^1G_4)1/2$ 6%
	68349	68375	26	X			$(^1G_4)1/2$ 41%, $(^3F_4)1/2$ 22%, $(^3F_4)3/2$ 15%
	68683	68544	−139	X	X		$(^3F)^4G$ 50%, $(^3F_3)3/2$ 35%, $(^3F_4)3/2$ 3%
	69181	69138	−43	X			$(^3F_4)3/2$ 36%, $(^1G_4)3/2$ 32%, $(^3F_3)3/2$ 6%
	69529	69686	157		X		$(^3F)^4F$ 65%, $(^3F_4)1/2$ 8%, $(^3P)^4F$ 5%
	70999	71021	22		X		$(^3P)^4G$ 43%, $(^3P)^2G$ 17%, $(^1D)^2G$ 12%
	71641	71592	−49	X			$(^1G_4)3/2$ 51%, $(^3F_4)3/2$ 37%, $(^3P)^4G$ 4%
	73119	73030	−89		X		$(^3P)^4G$ 36%, $(^1G)^2H$ 25%, $(^1G)^2G$ 15%
	73690	73606	−84		X		$(^1D)^2G$ 42%, $(^1G)^2H$ 12%, $(^1D)^2H$ 12%
	74675				X		$(^3F)^2H$ 51%, $(^1G)^2H$ 23%, $(^1D)^2H$ 15%
	75636	75762	126		X		$(^1G)^2G$ 38%, $(^1G)^2H$ 21%, $(^3F)^2H$ 9%
	77169				X		$(^3P)^4F$ 85%, $(^3F)^4F$ 6%
	81428				X		$(^3P)^2G$ 46%, $(^1G)^2G$ 28%, $(^1D)^2G$ 11%
	84446	84411	−35	X			$(^1I_6)3/2$ 78%, $*(^1H)^2H$ 8%, $*(^3H)^4H$ 5%
	85028					X	$*(^1G)^2G$ 35%, $*(^3H)^4H$ 34%, $(^1I_6)3/2$ 12%
	86442					X	$*(^3H)^4H$ 54%, $*(^1G)^2G$ 24%, $*(^3F)^4F$ 16%
	88134	88220	86			X	$*(^3G)^4G$ 57%, $*(^3F)^4F$ 35%
	89017	88949	−68			X	$*(^3F)^4F$ 39%, $*(^3G)^4G$ 35%, $*(^1G)^2G$ 16%
	90557	90629	72			X	$*(^3H)^2H$ 79%, $(^1D)^2H$ 5%, $*(^1G)^2G$ 4%
	95075	95148	73			X	$*(^3G)^2G$ 77%, $(^1D)^2G$ 8%, $*(^1G)^2G$ 8%
	99782					X	$*(^1H)^2H$ 85%, $(^1I_6)3/2$ 6%

TABLE IV. *Calculated energy levels and compositions of the mixed* $4f^26p$, $5d^24f$, *and* $4f5d6s$ *configurations of* Pr III. – Continued

The $4f^26p$ levels are designated in Jj-coupling. The levels of $5d^24f$ and $4f5d6s$ are designated in LS-coupling, with those of $4f5d6s$ distinguished by the symbol *. Levels attributed to two configurations contain 20 percent or more of each

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus calc.	Configuration			Composition					
				$4f^26p$	$5d^24f$	$4f5d6s$						
$5\frac{1}{2}$	60465	60420	−45	X			$(^3H_5)1/2$	94%				
	62243	62241	−2	X			$(^3H_4)3/2$	40%,	$(^3H_6)1/2$	35%,	$(^3H_5)3/2$	15%
	62569	62559	−10	X			$(^3H_6)1/2$	55%,	$(^3H_4)3/2$	37%		
	63811	63817	6	X	X		$(^3F)^4I$	50%,	$(^3H_5)3/2$	24%,	$(^3H_4)3/2$	15%
	64074	64151	77	X	X		$(^3F)^4I$	42%,	$(^3H_5)3/2$	39%,	$(^3F)^4H$	6%
	64951	64865	−86		X		$(^3F)^4H$	73%,	$(^3H_5)3/2$	15%		
	65912	65922	10	X			$(^3H_6)3/2$	88%,	$(^3F)^4H$	4%		
	68184	68238	54		X		$(^3F)^2I$	51%,	$(^1G)^2I$	36%,	$(^3F)^4H$	6%
	68514	68526	12	X			$(^3F_4)3/2$	53%,	$(^1G_4)3/2$	20%,	$(^3F)^4G$	14%
	69455	69409	−46		X		$(^3F)^2H$	37%,	$(^1D)^2H$	25%,	$(^3F)^4G$	11%
	69924	69978	54		X		$(^3F)^4G$	62%,	$(^1D)^2H$	11%,	$(^3P)^4G$	8%
	71714	71736	22	X			$(^1G_4)3/2$	65%,	$(^3F_4)3/2$	29%		
	73535	73609	74		X		$(^3P)^4G$	76%,	$(^3F)^2H$	9%,	$(^1G)^2H$	8%
	75641	75640	−1		X		$(^3F)^2H$	32%,	$(^1D)^2H$	18%,	$(^1G)^2I$	16%
	76097				X		$(^1G)^2H$	56%.	$(^1D)^2H$	27%,	$(^3P)^4G$	9%
	78869	78695	−174		X		$(^1G)^2I$	35%,	$(^3F)^2I$	25%,	$(^3F)^2H$	12%
	80312	80361	49	X			$(^1I_6)1/2$	80%,	$(^3F)^2I$	6%,	$(^1G)^2I$	6%
	83729	83607	−122	X			$(^1I_6)3/2$	87%,	$(^1I_6)1/2$	7%		
	87519					X	$*(^3H)^4H$	95%				
	90049	90120	71			X	$*(^3G)^4G$	96%				
	93283	93296	13			X	$*(^3H)^2H$	80%,	$*(^1H)^2H$	9%,	$*(^3H)^4H$	5%
	99971					X	$*(^1H)^2H$	82%,	$*(^3H)^2H$	10%		
$6\frac{1}{2}$	62725	62679	−46	X			$(^3H_6)1/2$	89%,	$(^3H_6)3/2$	6%		
	64218	64215	−3	X			$(^3H_5)3/2$	86%,	$(^3H_6)3/2$	8%		
	65944	65967	23		X		$(^3F)^4I$	86%,	$(^3F)^4H$	5%		
	66091	66148	57	X	X		$(^3H_6)3/2$	51%,	$(^3F)^4H$	25%,	$(^3H_5)3/2$	12%
	66872	66736	−136	X	X		$(^3F)^4H$	53%,	$(^3H_6)3/2$	32%,	$(^3F)^4I$	6%
	70452	70381	−71		X		$(^3F)^2I$	53%,	$(^1G)^2I$	29%,	$(^3F)^4H$	12%
	77201				X		$(^1G)^2K$	96%				
	79246	79136	−110		X		$(^1G)^2I$	51%,	$(^3F)^2I$	26%,	$(^1I_6)1/2$	17%
	80743	80989	246	X	X		$(^1I_6)1/2$	70%,	$(^1G)^2I$	12%,	$(^3F)^2I$	9%
	83713	83703	−10	X			$(^1I_6)3/2$	87%,	$(^1I_6)1/2$	11%		
	89758					X	$*(^3H)^4H$	100%				
$7\frac{1}{2}$	66298	66301	3	X			$(^3H_6)3/2$	96%				
	68285	68305	20		X		$(^3F)^4I$	95%				
	79787				X		$(^1G)^2K$	98%				
	84999	84992	−7	X			$(^1I_6)3/2$	98%				

The $5d^24f$ configuration is illustrated in figure 1. The observed levels are represented by solid lines and the calculated positions of unknown levels are given as dashed lines. The term designations represent the major components, although in many cases these are less than 50 percent. The identity of a unique major component in some cases is impossible. In spite of the intermediate coupling, the low-lying quartets exhibit a regularity in their structure characteristic of LS-coupling. This is also true of the equally complex $4f^25d$ configuration of the same ion [1]. Judd has shown that this structure arises from the near equality of $\zeta(4f)$ and $\zeta(5d)$, which results in nearly null non-diagonal matrix elements between terms of maximum multiplicity [22]. The structure of the $(^3F)^4H^0$ term is distorted by the strong mixture with $(^3F)^2G^0$.

The coupling in $4f5d6s$ is LS, but not very pure because of the large spin-orbit interactions. The basis states were constructed by first coupling the f and d electrons to form parent terms and then adding the s electron. If more levels had been found, it would probably have been possible to define parameters E_l and E_s for this configuration since they have been essential to other configurations of Pr III and Ce III containing both $4f$ and $5d$ electrons.

4.2. The $4f^25f$ Configuration

This is a well-isolated configuration which is quite amenable to individual treatment. The correspond-

TABLE V. *Fitted parameter values and associated standard errors for the* 4f²5f *configuration of* Pr III *and corresponding parameters of* Ce III *in units of* cm^{-1}

Parameters	Pr III	Ce III
	$4f^2 5f$	$4f5f$
A	118394 ± 16	101544 ± 12
$E^1(f^2)$	4983 9	
E^2	22.99 ± 0.05	
E^3	479 ± 1	
α	22.7 ± 0.4	
γ	−56 Fixed	
$F^2(ff')$	3150 ± 53	3150 ± 90
F^4	1870 ± 160	1420 ± 220
F^6	490 ± 190	736 ± ?
G^0	931 ± 9	1175 ± 14
G^2	1511 ± 71	1530 ± 110
G^4	1220 ± 170	870 ± 330
G^6	847 ± 140	736 ± ?
$\zeta_f(f^2)$	760 ± 2	639 ± 7
ζ_f'	22 ± 3	26 ± 8
rms error in calculated levels	28 cm^{-1}	39 cm^{-1}

ing configuration $4f5f$ of Ce III reported in reference 3 was treated theoretically by Spector [16], who obtained an rms error in the level predictions of 39 cm^{-1}.

As was found in the Ce III work, the highest purity of eigenvectors results from the use of the J_1l-coupling scheme. However, due to the large value of the exchange parameter $G^0(ff')$, substantial LS-components are obtained when the calculation is carried out in the LS-scheme. Analogous to Ce III, this condition permitted the experimental assignment of many LS terms on the basis of line intensities due to transitions to the LS-coupled $4f^25d$ configuration. These LS designations were essential in establishing the correspondence between the observed and calculated levels.

Initial parameter values were obtained from the $4f^2$ configuration of Pr IV for the $4f^2$ core interactions and from Spector's results in Ce III for the f-f' interaction as well as for $\zeta(5f)$.

Because no levels based on $4f^2(^3P)$ or (^1S) are known only 4 electrostatic core parameters could be fit to the 5 observed core terms. Therefore the "effective" interaction parameter γ was fixed at -56 cm^{-1}, the value obtained by S. Feneuille and N. Pelletier-Allard [23] in a recent calculation of $4f^2(6s+5d)$ of Pr III. The free parameters did not change significantly from their initial values.

All observed levels of odd parity in this region were fitted to the $4f^25f$ configuration. The final rms error in the calculated level positions was 28 cm^{-1}. The resulting parameters are given in table V along with the corresponding ones of $4f5f$ of Ce III.

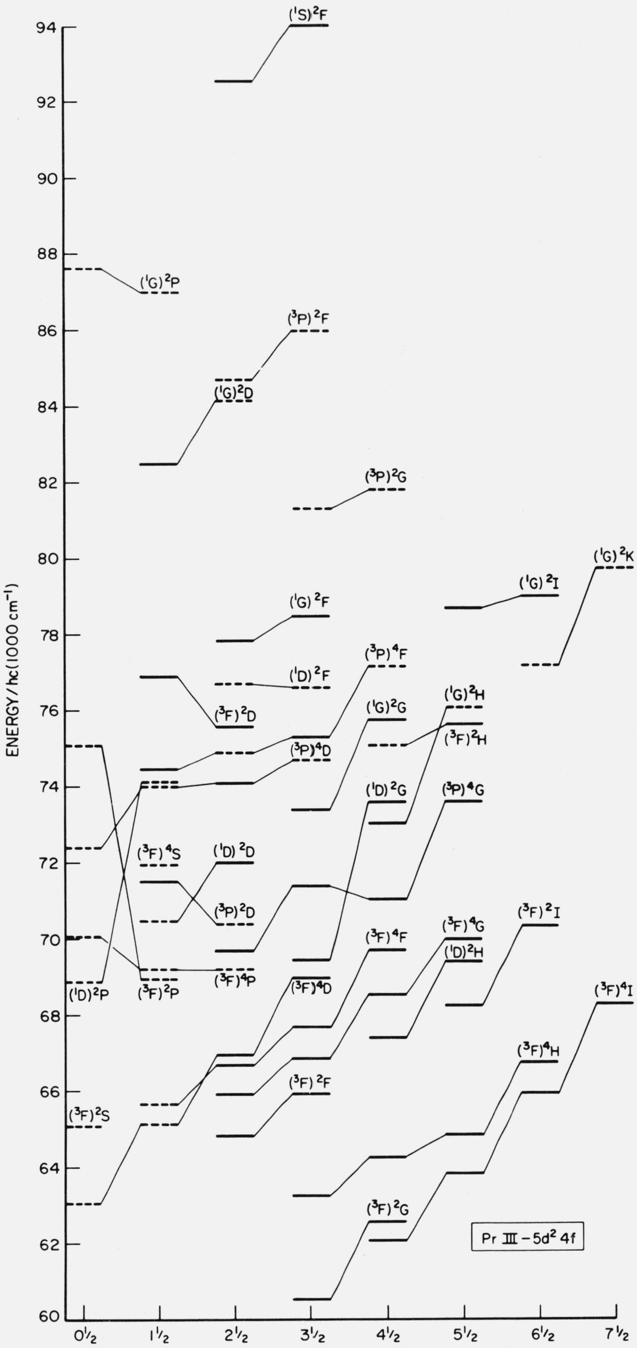

FIGURE 1. *Energy levels of the* 5d²4f *configuration of* Pr III.
Levels not observed are represented by dashed lines at their calculated positions.

The calculated and observed energy levels and eigenvectors of $4f^25f$ in J_1l-coupling are given in table VI. The designations show the $4f^2$ core level followed by the quantum number $K=(J_1+l)$ in square brackets. Because of the importance of the LS-coupling designations in the theoretical analysis they are included in a column containing the largest component in this scheme.

TABLE VI. *Calculated energy levels and compositions of the* $4f^25f$ *configuration of* Pr III.

Designations are in J_1l-coupling

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus Calc.	Composition in J_1l-coupling			Largest component in LS-coupling
$0\frac{1}{2}$	111748			$^3H_4$[1] 92%			(^{3}H)^{4}D 92%
	115693			$^3F_2$[1] 85%,	$^3F_3$[0] 5%		(^{3}F)^{2}S 41%
	116909			$^3F_3$[0] 70%,	$^3F_4$[1] 15%,	$^3F_3$[1] 8%	(^{3}F)^{4}P 60%
	117392			$^3F_3$[1] 78%,	$^3F_3$[0] 10%,	$^3F_2$[1] 7%	(^{3}F)^{4}D 65%
	118943			$^3F_4$[1] 70%,	$^3F_3$[0] 14%,	$^3F_3$[1] 7%	(^{3}F)^{2}P 61%
	120507			$^1G_4$[1] 85%,	$^3F_4$[1] 12%		(^{1}G)^{2}P 80%
	128370			$^1D_2$[1] 89%,	$^3P_2$[1] 6%		(^{1}D)^{2}P 88%
	134088			$^3P_2$[1] 93%			(^{3}P)^{4}D 92%
$1\frac{1}{2}$	111267	111269	2	$^3H_4$[2] 92%			(^{3}H)^{4}F 80%
	111755			$^3H_4$[1] 90%			(^{3}H)^{4}D 54%
	113803	113826	23	$^3H_5$[2] 93%			(^{3}H)^{2}D 45%
	115948			$^3F_2$[1] 77%,	$^3F_4$[1] 10%,	$^3F_2$[2] 4%	(^{3}F)^{4}P 70%
	116812			$^3F_2$[2] 82%,	$^3F_2$[1] 3%,	$^3F_3$[2] 3%	(^{3}F)^{2}D 37%
	117552	117540	−12	$^3F_3$[1] 26%,	$^3F_4$[1] 22%,	$^3F_4$[2] 21%	(^{3}F)^{2}P 24%
	118154	118201	47	$^3F_3$[2] 59%,	$^3F_3$[1] 25%,	$^1G_4$[1] 7%	(^{3}F)^{4}F 34%
	118260			$^3F_4$[2] 38%,	$^3F_3$[1] 22%,	$^3F_3$[2] 20%	(^{3}F)^{4}D 39%
	119010			$^3F_4$[1] 31%,	$^3F_3$[1] 20%,	$^3F_2$[1] 14%	(^{3}F)^{4}S 62%
	121489			$^1G_4$[1] 48%,	$^3F_4$[1] 27%,	$^1G_4$[2] 15%	(^{1}G)^{2}P 43%
	122588			$^1G_4$[2] 56%,	$^3F_4$[2] 25%,	$^1G_4$[1] 10%	(^{1}G)^{2}D 51%
	128163	128214	51	$^1D_2$[1] 84%,	$^3P_2$[1] 7%		(^{1}D)^{2}P 83%
	128942			$^1D_2$[2] 85%,	$^3P_2$[2] 6%		(^{1}D)^{2}D 83%
	132798			$^3P_1$[2] 89%,	$^3P_2$[2] 11%		(^{3}P)^{4}F 62%
	133895			$^3P_2$[2] 63%,	$^3P_2$[1] 23%,	$^3P_1$[2] 7%	(^{3}P)^{2}D 64%
	134173			$^3P_2$[1] 69%,	$^3P_2$[2] 19%,	$^1D_2$[1] 4%	(^{3}P)^{4}D 74%
$2\frac{1}{2}$	111489	111495	6	$^3H_4$[2] 64%,	$^3H_4$[3] 28%		(^{3}H)^{4}F 59%
	111928			$^3H_4$[3] 63%,	$^3H_4$[2] 28%		(^{3}H)^{4}G 52%
	113542	113557	15	$^3H_5$[3] 45%,	$^3H_5$[2] 44%,	$^3F_2$[2] 6%	(^{3}H)^{4}D 23%
	113902	113914	12	$^3H_5$[2] 46%,	$^3H_5$[3] 45%		(^{3}H)^{2}F 38%
	115831	115800	−31	$^3H_6$[3] 48%,	$^3F_2$[2] 43%		(^{3}H)^{2}D 47%
	116471			$^3H_6$[3] 38%,	$^3F_2$[2] 23%,	$^3F_2$[3] 18%	(^{3}F)^{4}P 26%
	116711	116727	16	$^3F_2$[3] 66%,	$^3F_3$[3] 9%,	$^3F_2$[2] 6%	(^{3}F)^{4}G 50%
	117609			$^3F_3$[2] 51%,	$^3F_3$[3] 26%,	$^1G_4$[3] 6%	(^{3}F)^{2}F 30%
	117651	117686	35	$^3F_3$[3] 33%,	$^3F_4$[2] 14%,	$^3F_2$[2] 13%	(^{3}F)^{4}D 42%
	118612			$^3F_3$[3] 32%,	$^3F_4$[3] 26%,	$^3F_4$[2] 13%	(^{3}F)^{4}F 54%
	118952			$^3F_4$[2] 51%,	$^3F_4$[3] 22%,	$^1G_4$[3] 10%	(^{3}F)^{2}D 31%
	120686			$^1G_4$[3] 57%,	$^3F_4$[3] 20%,	$^1G_4$[2] 17%	(^{1}G)^{2}F 53%
	121763			$^1G_4$[2] 66%,	$^3F_4$[3] 15%,	$^1G_4$[3] 7%	(^{1}G)^{2}D 64%
	128590			$^1D_2$[3] 85%,	$^3P_2$[3] 9%		(^{1}D)^{2}F 83%
	128833			$^1D_2$[2] 84%,	$^3P_2$[2] 7%		(^{1}D)^{2}D 82%
	132127			$^3P_0$[3] 86%,	$^3P_1$[3] 10%		(^{3}P)^{4}G 64%
	132709			$^3P_1$[3] 86%,	$^3P_0$[3] 8%		(^{3}P)^{2}D 37%
	133044			$^3P_1$[2] 64%,	$^1I_6$[3] 18%,	$^3P_2$[2] 13%	(^{3}P)^{4}F 28%
	133832			$^3P_2$[3] 45%,	$^1I_6$[3] 41%,	$^3P_2$[2] 4%	(^{1}I)^{2}F 41%
	134221			$^3P_2$[2] 54%,	$^3P_1$[2] 20%,	$^3P_2$[3] 12%	(^{3}P)^{4}D 55%
	136510			$^1I_6$[3] 37%,	$^3P_2$[3] 29%,	$^3P_2$[2] 24%	(^{3}P)^{2}F 52%
	163236			$^1S_0$[3] 99%			(^{1}S)^{2}F 99%
$3\frac{1}{2}$	110340	110334	−6	$^3H_4$[4] 91%			(^{3}H)^{4}H 81%
	111381	111343	−38	$^3H_4$[3] 87%,	$^3H_4$[4] 4%		(^{3}H)^{2}G 40%
	113308	113292	−16	$^3H_5$[4] 50%,	$^3H_5$[3] 46%		(^{3}H)^{4}F 44%
	113639	113631	−8	$^3H_5$[3] 46%,	$^3H_5$[4] 40%,	$^3F_3$[4] 3%	(^{3}H)^{4}G 51%
	115405	115421	16	$^3H_6$[3] 36%,	$^3H_6$[4] 28%,	$^3F_2$[3] 27%	(^{3}H)^{4}D 35%
	115672	115670	−2	$^3F_2$[4] 89%,	$^3F_3$[4] 4%		(^{3}F)^{4}H 82%
	116021	116022	1	$^3H_6$[3] 41%,	$^3H_6$[4] 39%,	$^3F_4$[3] 4%	(^{3}H)^{2}F 42%
	117029	117045	16	$^3F_2$[3] 57%,	$^3H_6$[4] 25%,	$^3F_3$[3] 5%	(^{3}F)^{4}G 21%
	117671	117647	−24	$^3F_3$[4] 64%,	$^3F_3$[3] 10%,	$^1G_4$[3] 8%	(^{3}F)^{2}F 33%
	118143			$^3F_4$[3] 26%,	$^1G_4$[3] 19%,	$^3F_4$[4] 17%	(^{3}F)^{4}D 40%
	118321	118319	−2	$^3F_3$[3] 60%,	$^3F_3$[4] 16%,	$^3F_4$[4] 7%	(^{3}F)^{2}G 41%
	118967			$^3F_4$[4] 47%,	$^3F_4$[3] 21%,	$^1G_4$[4] 18%	(^{3}F)^{4}F 41%
	121401			$^1G_4$[3] 41%,	$^3F_4$[3] 29%,	$^1G_4$[4] 23%	(^{1}G)^{2}F 36%
	121599			$^1G_4$[4] 50%,	$^3F_4$[4] 21%,	$^1G_4$[3] 17%	(^{1}G)^{2}G 45%
	128456	128453	−3	$^1D_2$[4] 87%,	$^3P_2$[4] 6%,		(^{1}D)^{2}G 86%
	129012			$^1D_2$[3] 88%,	$^3P_2$[3] 6%		(^{1}D)^{2}F 86%
	132256			$^3P_0$[3] 76%,	$^3P_1$[4] 8%,	$^3P_1$[3] 8%	(^{3}P)^{4}G 41%
	132760			$^3P_1$[4] 62%,	$^1I_6$[4] 25%,	$^1I_6$[3] 6%	(^{3}P)^{2}G 37%
	132869			$^3P_1$[3] 72%,	$^3P_0$[3] 11%,	$^3P_1$[4] 8%	(^{3}P)^{4}D 53%

TABLE VI. *Calculated energy levels and compositions of the* $4f^25f$ *configuration of* Pr III. – Continued

Designations are in J_1l-coupling

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus Calc.	Composition in J_1l-coupling	Largest component in *LS*-coupling
	133585			$^{1}I_{6}[3]$ 42%, $^{3}P_{2}[4]$ 33%, $^{1}I_{6}[4]$ 17%	$(^{1}I)^{2}F$ 42%
	134108			$^{3}P_{2}[3]$ 75%, $^{3}P_{2}[4]$ 11%, $^{1}D_{2}[3]$ 7%	$(^{3}P)^{4}F$ 54%
	134896			$^{1}I_{6}[4]$ 48%, $^{3}P_{1}[4]$ 19%, $^{1}I_{6}[3]$ 10%	$(^{1}I)^{2}G$ 48%
	136377			$^{3}P_{2}[4]$ 45%, $^{1}I_{6}[3]$ 37%, $^{3}P_{2}[3]$ 11%	$(^{3}P)^{2}F$ 54%
	163249			$^{1}S_{0}[3]$ 99%	$(^{1}S)^{2}F$ 99%
$4\frac{1}{2}$	110906	110922	16	$^{3}H_{4}[4]$ 66%, $^{3}H_{4}[5]$ 21%, $^{3}H_{5}[5]$ 8%	$(^{3}F)^{4}H$ 70%
	111915	111993	78	$^{3}H_{4}[5]$ 72%, $^{3}H_{4}[4]$ 25%	$(^{3}F)^{2}I$ 58%
	113154	113159	5	$^{3}H_{5}[5]$ 62%, $^{3}H_{5}[4]$ 26%, $^{3}H_{4}[4]$ 6%	undefined
	113783	113780	−3	$^{3}H_{5}[4]$ 66%, $^{3}H_{5}[5]$ 28%	$(^{3}H)^{2}H$ 35%
	115334	115324	−10	$^{3}H_{6}[4]$ 46%, $^{3}H_{6}[5]$ 26%, $^{3}F_{2}[4]$ 18%	$(^{3}H)^{4}F$ 35%
	115519	115500	−19	$^{3}H_{6}[5]$ 59%, $^{3}H_{6}[4]$ 36%	$(^{3}H)^{2}G$ 54%
	115841			$^{3}F_{2}[5]$ 87%, $^{3}F_{2}[4]$ 3%	$(^{3}H)^{4}H$ 71%
	116456	116453	−3	$^{3}F_{2}[4]$ 52%, $^{3}F_{3}[5]$ 20%, $^{3}F_{3}[4]$ 7%	$(^{3}P)^{4}H$ 54%
	117516			$^{3}F_{3}[5]$ 44%, $^{3}F_{2}[4]$ 17%, $^{3}F_{4}[5]$ 11%	$(^{3}F)^{2}H$ 36%
	118076	118081	5	$^{3}F_{3}[4]$ 40%, $^{3}F_{4}[5]$ 18%, $^{3}F_{4}[4]$ 16%	$(^{3}F)^{2}G$ 36%
	118495	118469	−26	$^{3}F_{4}[5]$ 36%, $^{3}F_{3}[5]$ 32%, $^{3}F_{3}[4]$ 14%	$(^{3}F)^{4}G$ 36%
	118911			$^{3}F_{4}[4]$ 43%, $^{3}F_{3}[4]$ 24%, $^{1}G_{4}[4]$ 22%	$(^{3}F)^{4}F$ 65%
	121376	121383	7	$^{1}G_{4}[5]$ 51%, $^{3}F_{4}[5]$ 21%, $^{1}G_{4}[4]$ 14%	$(^{1}G)^{2}H$ 46%
	122121			$^{1}G_{4}[4]$ 50%, $^{3}F_{4}[4]$ 24%, $^{1}G_{4}[5]$ 14%	$(^{1}G)^{2}G$ 45%
	128360	128353	−7	$^{1}D_{2}[5]$ 78%, $^{1}D_{2}[4]$ 10%, $^{3}P_{2}[5]$ 7%	$(^{1}D)^{2}H$ 77%
	128584	128569	−15	$^{1}D_{2}[4]$ 79%, $^{1}D_{2}[5]$ 11%, $^{3}P_{2}[4]$ 6%	$(^{1}D)^{2}G$ 78%
	132719			$^{3}P_{1}[4]$ 89%, $^{1}I_{6}[4]$ 9%	$(^{3}P)^{4}G$ 48%
	133285			$^{1}I_{6}[5]$ 80%, $^{3}P_{2}[5]$ 11%	$(^{1}I)^{2}H$ 80%
	133459			$^{1}I_{6}[4]$ 43%, $^{3}P_{2}[5]$ 29%, $^{1}I_{6}[5]$ 17%	$(^{1}I)^{2}G$ 43%
	134030			$^{3}P_{2}[4]$ 90%	$(^{3}P)^{4}F$ 65%
	135078			$^{3}P_{2}[5]$ 52%, $^{1}I_{6}[4]$ 37%, $^{3}P_{1}[4]$ 5%	$(^{3}P)^{2}G$ 54%
$5\frac{1}{2}$	110308	110295	−13	$^{3}H_{4}[6]$ 83%, $^{3}H_{4}[5]$ F3%	$(^{3}H)^{4}K$ 74%
	110876	110881	5	$^{3}H_{4}[5]$ 78%, $^{3}H_{4}[6]$ 12%	$(^{3}H)^{2}I$ 41%
	112636	112643	7	$^{3}H_{5}[5]$ 66%, $^{3}H_{5}[6]$ 29%	$(^{3}H)^{4}H$ 61%
	113664	113664	0	$^{3}H_{5}[6]$ 61%, $^{3}H_{5}[5]$ 28%, $^{3}H_{4}[5]$ 4%	$(^{3}H)^{4}I$ 67%
	115402	115403	1	$^{3}H_{6}[6]$ 64%, $^{3}H_{6}[5]$ 21%, $^{3}F_{4}[5]$ 5%	$(^{3}H)^{2}H$ 34%
	115934	115933	−1	$^{3}H_{6}[5]$ 50%, $^{3}H_{6}[6]$ 19%, $^{3}F_{3}[5]$ 6%	$(^{3}H)^{4}G$ 41%
	116276	116309	33	$^{3}F_{2}[5]$ 63%, $^{3}H_{6}[5]$ 11%, $^{3}H_{6}[6]$ 10%	$(^{3}F)^{4}I$ 31%
	117320	117323	3	$^{3}F_{3}[6]$ 35%, $^{3}F_{3}[5]$ 26%, $^{3}F_{4}[6]$ 22%	$(^{3}F)^{4}H$ 28%
	117577	117574	−3	$^{3}F_{3}[5]$ 51%, $^{3}F_{3}[6]$ 32%, $^{1}G_{4}[6]$ 6%	$(^{3}F)^{2}I$ 48%
	118304	118272	−32	$^{3}F_{4}[5]$ 22%, $^{3}F_{4}[6]$ 17%, $^{1}G_{4}[5]$ 14%	$(^{3}F)^{4}G$ 32%
	118926	118879	−47	$^{3}F_{4}[5]$ 35%, $^{1}G_{4}[6]$ 19%, $^{3}F_{4}[6]$ 18%	$(^{3}F)^{2}H$ 37%
	121078	121095	17	$^{1}G_{4}[5]$ 45%, $^{3}F_{4}[5]$ 23%, $^{1}G_{4}[6]$ 19%	$(^{1}G)^{2}H$ 40%
	121546	121532	−14	$^{1}G_{4}[6]$ 35%, $^{3}F_{4}[6]$ 31%, $^{1}G_{4}[5]$ 26%	$(^{1}G)^{2}I$ 31%
	128364	128382	18	$^{1}D_{2}[5]$ 89%, $^{3}P_{2}[5]$ 8%	$(^{1}D)^{2}H$ 88%
	133162			$^{1}I_{6}[6]$ 83%, $^{1}I_{6}[5]$ 16%	$(^{1}I)^{2}I$ 83%
	133322			$^{1}I_{6}[5]$ 76%, $^{1}I_{6}[6]$ 16%	$(^{1}I)^{2}H$ 76%
	133955			$^{3}P_{2}[5]$ 84%, $^{1}D_{2}[5]$ 8%	$(^{3}P)^{4}G$ 83%
$6\frac{1}{2}$	110535	110531	−4	$^{3}H_{4}[7]$ 97%	$(^{3}H)^{4}L$ 89%
	111115	111110	−5	$^{3}H_{4}[6]$ 87%, $^{3}H_{5}[7]$ 8%	$(^{3}H)^{4}K$ 59%
	112756	112770	14	$^{3}H_{5}[7]$ 51%, $^{3}H_{5}[6]$ 38%	$(^{3}H)^{2}I$ 39%
	113570	113600	30	$^{3}H_{5}[6]$ 49%, $^{3}H_{5}[7]$ 37%, $^{3}H_{6}[6]$ 9%	$(^{3}H)^{2}K$ 43%
	114792	114797	5	$^{3}H_{6}[6]$ 69%, $^{3}H_{6}[7]$ B4%	$(^{3}H)^{4}H$ 48%
	115369	115408	39	$^{3}H_{6}[7]$ 64%, $^{3}H_{6}[6]$ 19%, $^{3}F_{3}[6]$ 8%	$(^{3}H)^{4}I$ 60%
	117263	117248	−15	$^{3}F_{3}[6]$ 56%, $^{3}F_{4}[6]$ 29%, $^{1}G_{4}[6]$ 11%	$(^{3}F)^{4}H$ 54%
	117762	117775	13	$^{3}F_{4}[7]$ 28%, $^{3}F_{4}[6]$ 28%, $^{3}F_{3}[6]$ 21%	$(^{3}F)^{4}I$ 61%
	118629	118611	−18	$^{3}F_{4}[7]$ 36%, $^{1}G_{4}[7]$ 25%, $^{3}F_{4}[6]$ 19%	$(^{3}F)^{2}I$ 55%
	120502	120499	−3	$^{1}G_{4}[6]$ 61%, $^{3}F_{4}[6]$ 21%, $^{1}G_{4}[7]$ 15%	$(^{1}G)^{2}I$ 56%
	121437	121431	−6	$^{1}G_{4}[7]$ 50%, $^{3}F_{4}[7]$ 30%, $^{1}G_{4}[6]$ 14%	$(^{1}G)^{2}K$ 44%
	132708			$^{1}I_{6}[7]$ 100%	$(^{1}I)^{2}K$ 100%
	133181			$^{1}I_{6}[6]$ 99%	$(^{1}I)^{2}I$ 99%
$7\frac{1}{2}$	111339	111335	−4	$^{3}H_{4}[7]$ 82%, $^{3}H_{5}[8]$ 16%	$(^{3}H)^{4}L$ 67%
	112895	112896	1	$^{3}H_{5}[7]$ 88%, $^{3}H_{6}[8]$ 6%	$(^{3}H)^{4}K$ 72%
	113832	113834	2	$^{3}H_{5}[8]$ 79%, $^{3}H_{4}[7]$ 15%	$(^{3}H)^{2}L$ 76%
	115666	115672	6	$^{3}H_{6}[8]$ 71%, $^{3}H_{6}[7]$ 14%, $^{3}H_{5}[7]$ 5%	$(^{3}H)^{2}K$ 57%
	116196	116239	43	$^{3}H_{6}[7]$ 78%, $^{3}H_{6}[8]$ 17%	$(^{3}H)^{4}I$ 72%
	118051	118063	12	$^{3}F_{4}[7]$ 70%, $^{1}G_{4}[7]$ 19%, $^{3}H_{6}[8]$ 2%	$(^{3}F)^{4}I$ 65%
	121087	121119	32	$^{1}G_{4}[7]$ 73%, $^{3}F_{4}[7]$ 23%	$(^{1}G)^{2}K$ 67%
	132780			$^{1}I_{6}[7]$ 98%	$(^{1}I)^{2}K$ 98%
	133421	133352	−69	$^{1}I_{6}[8]$ 98%	$(^{1}I)^{2}L$ 98%

TABLE VI. *Calculated energy levels and compositions of the* 4f²5f *configuration of* Pr III. — Continued

Designations are in J_1l-coupling

J	Levels calculated (cm⁻¹)	Levels observed (cm⁻¹)	Obs. minus Calc.	Composition in J_1l-coupling		Largest component in LS-coupling
$8\frac{1}{2}$	113026	113024	−2	$^3H_5[8]$ 94%		$(^3H)^4L$ 94%
	114733	114726	−7	$^3H_6[8]$ 95%		$(^3H)^4K$ 95%
	116497	116490	−7	$^3H_6[9]$ 89%,	$^3H_5[8]$ 6%	$(^3H)^2L$ 89%
	133120	133194	74	$^1I_6[9]$ 98%		$(^1I)^2M$ 98%
	133438	133373	−65	$^1I_6[8]$ 97%		$(^1I)^2L$ 97%
$9\frac{1}{2}$	114978	114971	−7	$^3H_6[9]$ 100%		$(^3H)^4L$ 100%
	133191	133242	51	$^1I_6[9]$ 100%		$(^1I)^2M$ 100%

The energy level structure of $4f^25f$ is shown in figure 2 in J_1l-coupling. Pairs of levels of equal J_1 and K are connected and the $4f^2$ core is indicated. The experimentally derived levels are drawn with solid lines, and those not found are drawn with dashed lines at their calculated positions. By comparing this structure with that of $4f5f$ of Ce III shown in figure 4 of reference 3, we note a decrease in the pair splittings in Pr III, indicating a trend with increasing Z to purer J_1l coupling. The electrostatic parameter $G^0(ff')$ has decreased by 20 percent from its value in Ce III while $F^2(ff')$ remains unchanged.

4.3. The $4f^26d$ and $4f^27s$ Configurations

Levels of both of these configurations were given in ref. 2, but were all designated as $4f^26d$. They were derived from transitions to $4f^26p$. No distinction between configurations was evident from relative line intensities.

The present analysis of this transition array revealed 26 more levels belonging to the upper two configurations. A clue as to the designation of these levels is the fact that nearly all observed transitions from a given upper level has the same $4f^2$ core level of $4f^26p$ in common. This arises from the condition that both the upper and lower configurations exhibit good J_1j-coupling.

The two configurations $4f^26d$ and $4f^27s$ were expected to overlap because of the arrangement of the corresponding Ce III configurations $4f6d$ and $4f7s$. To unravel them, I calculated their energy levels using the parameters of Ce III for the f-d and f-s interactions, and compared the result with the known levels. It was then possible to recognize the level groupings in the two configurations.

For both configurations, levels based only on the two core levels ^3H and ^3F are known. Therefore, only one core electrostatic parameter, namely E^3, could be determined. The ratios E^1/E^3 and E^1/E^2 were fixed at the values 10.3 and 216, respectively. These ratios are nearly equal in the configurations [17, 23] $4f^3$, $4f^2(5d+6s)$, and $4f^26p$ (table III of present work) of Pr III, and $4f^2$ of Pr IV(see table III). The parameters α and γ of the $4f^2$ core were fixed at the values found in $4f^26s$ of Pr III [23].

The least squares adjustment of the $4f$-$6d$ and $4f$-$7s$ interaction parameters produced the well-defined values given in tables VII and IX. The corresponding parameters of $4f6d$ in Ce III are also given. A diagonalization with these final parameters provided the calculated levels and eigenvectors in J_1j-coupling shown in table VIII for the $4f^2(^3H,^3F)6d$ levels. A complete listing of the calculated results is not given because of the small number of known levels. The eigenvectors were also calculated in the J_1l-coupling scheme. The overall purity of levels was found to be lower than in J_1j, as is the case in Ce III for $4f6d$ [16].

A diagram of the configurations $4f^2(^3H, ^3F)$ $6d$ and $7s$ is given in figure 3. As in figures 1 and 2, observed levels are given as solid lines while those not yet located are represented by dashed lines at their calculated positions. Levels are connected which are based on the same J_1 core level.

TABLE VII. *Fitted parameter values and associated standard errors for the* 4f²6d *configuration of* Pr III *and corresponding parameters of* Ce III *in units of* cm⁻¹.

Parameters	Pr III	Ce III
	$4f^26d$	$4f6d$
A	108321 ± 20	91509 ± 36
$E^1(f^2)$	4927 Fixed E^1/E^3	
E^2	22.8 Fixed E^2/E^3	
E^3	479 ± 2	
α	23 Fixed	
γ	−56 Fixed	
$F^2(fd)$	4070 ±100	3260 ± 320
F^4	2500 ±190	1730 ± 690
G^1	1396 ± 60	1330 ± 180
G^3	1500 ±220	540 ± 690
G^5	2590 ±160	1980 ± 610
ζ_f	766 ± 3	642 ± 20
ζ_d	197 ± 7	239 ± 36
rms error in calculated levels	31 cm⁻¹	139 cm⁻¹

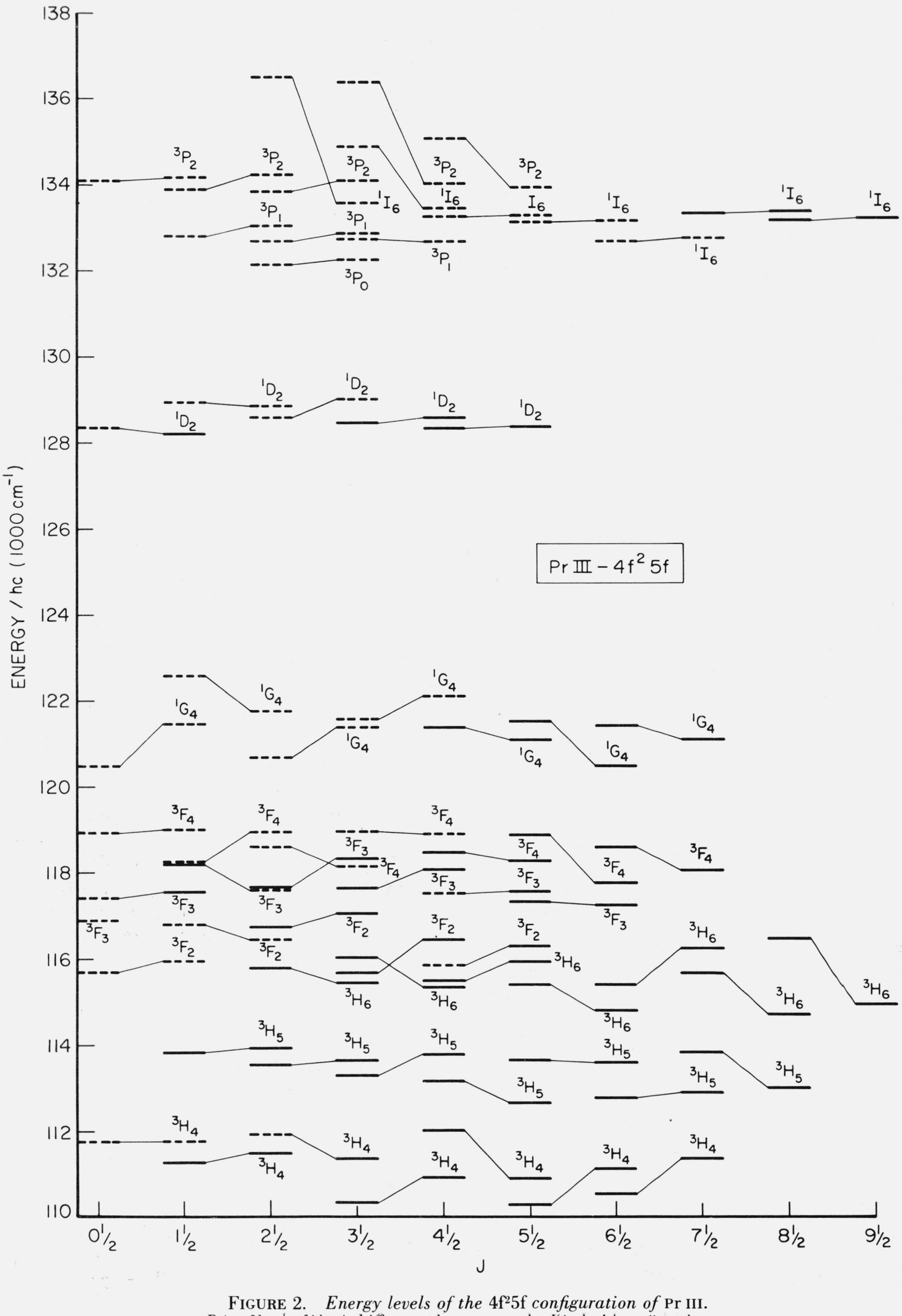

FIGURE 2. *Energy levels of the* 4f^{2}5f *configuration of* Pr III.
Pairs of levels of identical $4f^2$ core and quantum number K in the J_1l-coupling scheme are connected. Levels not observed are represented by dashed lines at their calculated positions.

TABLE VIII. *Calculated energy levels and compositions of the* $4f^26d$ *configuration of* Pr III.

Designations are in J_1j-coupling. Only levels built primarily on $4f^2(^3\mathrm{H})$ and $4f^2(^3\mathrm{F})$ core levels are given.

J	Levels calculated (cm^{-1})	Levels observed (cm^{-1})	Obs. minus calc.	Composition in J_1j-coupling		
$0\frac{1}{2}$	105740			$(^3\mathrm{F}_2)3/2$ 92%		
	105973			$(^3\mathrm{F}_2)5/2$ 93%		
	107684			$(^3\mathrm{F}_3)5/2$ 99%		
$1\frac{1}{2}$	101658			$(^3\mathrm{H}_4)5/2$ 97%		
	106059			$(^3\mathrm{F}_2)3/2$ 92%		
	106154			$(^3\mathrm{F}_2)5/2$ 94%		
	107120			$(^3\mathrm{F}_3)3/2$ 96%		
	107844			$(^3\mathrm{F}_3)5/2$ 82%,	$(^3\mathrm{F}_4)5/2$ 7%,	$(^3\mathrm{F}_3)3/2$ 4%
	108345			$(^3\mathrm{F}_4)5/2$ 56%,	$(^1\mathrm{G}_4)5/2$ 31%,	$(^3\mathrm{F}_3)5/2$ 10%
$2\frac{1}{2}$	101071	101071	0	$(^3\mathrm{H}_4)3/2$ 50%,	$(^3\mathrm{H}_4)5/2$ 45%	
	101715	101666	−49	$(^3\mathrm{H}_4)5/2$ 52%,	$(^3\mathrm{H}_4)3/2$ 43%	
	104106			$(^3\mathrm{H}_5)5/2$ 94%		
	105741			$(^3\mathrm{F}_2)3/2$ 85%,	$(^3\mathrm{F}_2)5/2$ 8%	
	106369			$(^3\mathrm{F}_2)5/2$ 87%,	$(^3\mathrm{F}_2)3/2$ 6%	
	107280			$(^3\mathrm{F}_3)3/2$ 83%,	$(^3\mathrm{F}_3)5/2$ 6%,	$(^3\mathrm{F}_4)5/2$ 4%
	107600			$(^3\mathrm{F}_4)3/2$ 62%,	$(^1\mathrm{G}_4)3/2$ 26%,	$(^3\mathrm{F}_3)3/2$ 6%
	107799			$(^3\mathrm{F}_3)5/2$ 75%,	$(^3\mathrm{F}_3)3/2$ 8%,	$(^1\mathrm{G}_4)5/2$ 7%
	108809			$(^3\mathrm{F}_4)5/2$ 52%,	$(^1\mathrm{G}_4)5/2$ 25%,	$(^3\mathrm{F}_3)5/2$ 14%
$3\frac{1}{2}$	100783	100789	6	$(^3\mathrm{H}_4)3/2$ 65%,	$(^3\mathrm{H}_4)5/2$ 31%	
	101477	101446	−31	$(^3\mathrm{H}_4)5/2$ 64%,	$(^3\mathrm{H}_4)3/2$ 28%	
	103361	103309	−52	$(^3\mathrm{H}_5)3/2$ 93%		
	103955	103896	−59	$(^3\mathrm{H}_5)5/2$ 95%		
	105514			$(^3\mathrm{F}_2)3/2$ 89%,	$(^3\mathrm{F}_2)5/2$ 7%,	
	106433			$(^3\mathrm{F}_2)5/2$ 77%,	$(^3\mathrm{F}_3)3/2$ 13%	
	106496			$(^3\mathrm{H}_6)5/2$ 86%,	$(^3\mathrm{F}_3)3/2$ 5%	
	107328	107299	−29	$(^3\mathrm{F}_3)3/2$ 64%,	$(^3\mathrm{F}_4)3/2$ 8%,	$(^3\mathrm{F}_3)5/2$ 8%
	107890			$(^3\mathrm{F}_4)3/2$ 34%,	$(^3\mathrm{F}_4)5/2$ 26%,	$(^1\mathrm{G}_4)3/2$ 19%
	108173			$(^3\mathrm{F}_3)5/2$ 54%,	$(^3\mathrm{F}_3)3/2$ 12%,	$(^3\mathrm{F}_4)3/2$ 11%
	108305			$(^1\mathrm{G}_4)5/2$ 30%,	$(^3\mathrm{F}_4)5/2$ 27%,	$(^3\mathrm{F}_3)5/2$ 25%
$4\frac{1}{2}$	100415	100430	15	$(^3\mathrm{H}_4)3/2$ 96%,		
	100954	100947	−7	$(^3\mathrm{H}_4)5/2$ 94%		
	102853	102830	−23	$(^3\mathrm{H}_5)3/2$ 79%,	$(^3\mathrm{H}_5)5/2$ 18%,	
	103327	103335	8	$(^3\mathrm{H}_5)5/2$ 74%,	$(^3\mathrm{H}_5)3/2$ 18%	
	105519	105567	48	$(^3\mathrm{H}_6)3/2$ 96%		
	106245			$(^3\mathrm{F}_2)5/2$ 61%,	$(^3\mathrm{H}_6)5/2$ 25%,	$(^3\mathrm{F}_3)3/2$ 8%
	106346			$(^3\mathrm{H}_6)5/2$ 69%,	$(^3\mathrm{F}_2)5/2$	
	107190			$(^3\mathrm{F}_3)3/2$ 54%,	$(^3\mathrm{F}_4)3/2$ 19%,	$(^1\mathrm{G}_4)3/2$ 12%
	107819			$(^3\mathrm{F}_3)5/2$ 83%,	$(^1\mathrm{G}_4)3/2$ 8%	
	107872	107854	−18	$(^3\mathrm{F}_4)3/2$ 32%,	$(^3\mathrm{F}_3)3/2$ 20%,	$(^1\mathrm{G}_4)3/2$ 13%
	108600			$(^3\mathrm{F}_4)5/2$ 42%,	$(^1\mathrm{G}_4)5/2$ 33%,	$(^3\mathrm{F}_3)3/2$ 9%
$5\frac{1}{2}$	100617	100625	8	$(^3\mathrm{H}_4)3/2$ 96%		
	101165	101165	0	$(^3\mathrm{H}_4)5/2$ 94%		
	102639	102617	−22	$(^3\mathrm{H}_5)3/2$ 95%		
	103336	103344	8	$(^3\mathrm{H}_5)5/2$ 96%		
	104924	104905	−19	$(^3\mathrm{H}_6)3/2$ 93%		
	105458	105450	−8	$(^3\mathrm{H}_6)5/2$ 82%		
	107403			$(^3\mathrm{F}_3)5/2$ 67%,	$(^3\mathrm{F}_4)3/2$ 24%	
	107720			$(^3\mathrm{F}_4)3/2$ 29%,	$(^3\mathrm{F}_4)5/2$ 20%,	$(^3\mathrm{F}_3)5/2$ 19%
	108527	108559	32	$(^3\mathrm{F}_4)5/2$ 42%,	$(^1\mathrm{G}_4)5/2$ 21%,	$(^1\mathrm{G}_4)3/2$ 15%
$6\frac{1}{2}$	101667	101680	13	$(^3\mathrm{H}_4)5/2$ 84%,	$(^3\mathrm{H}_5)3/2$ 10%	
	102988	102982	−6	$(^3\mathrm{H}_5)3/2$ 51%,	$(^3\mathrm{H}_5)5/2$ 47%	
	103764	103805	41	$(^3\mathrm{H}_5)5/2$ 48%,	$(^3\mathrm{H}_5)3/2$ 39%	
	105020	105019	−1	$(^3\mathrm{H}_6)3/2$ 86%,	$(^3\mathrm{H}_6)5/2$ 13%	
	105644	105632	−12	$(^3\mathrm{H}_6)5/2$ 85%,	$(^3\mathrm{H}_6)3/2$ 12%	
	107979			$(^3\mathrm{F}_4)5/2$ 70%,	$(^1\mathrm{G}_4)5/2$ 27%	
$7\frac{1}{2}$	103488	103484	−4	$(^3\mathrm{H}_5)5/2$ 95%		
	105080	105050	−30	$(^3\mathrm{H}_6)5/2$ 57%,	$(^3\mathrm{H}_6)3/2$ 42%	
	106356			$(^3\mathrm{H}_6)3/2$ 54%,	$(^3\mathrm{H}_6)5/2$ 41%	
$8\frac{1}{2}$	105513			$(^3\mathrm{H}_6)5/2$ 100%		

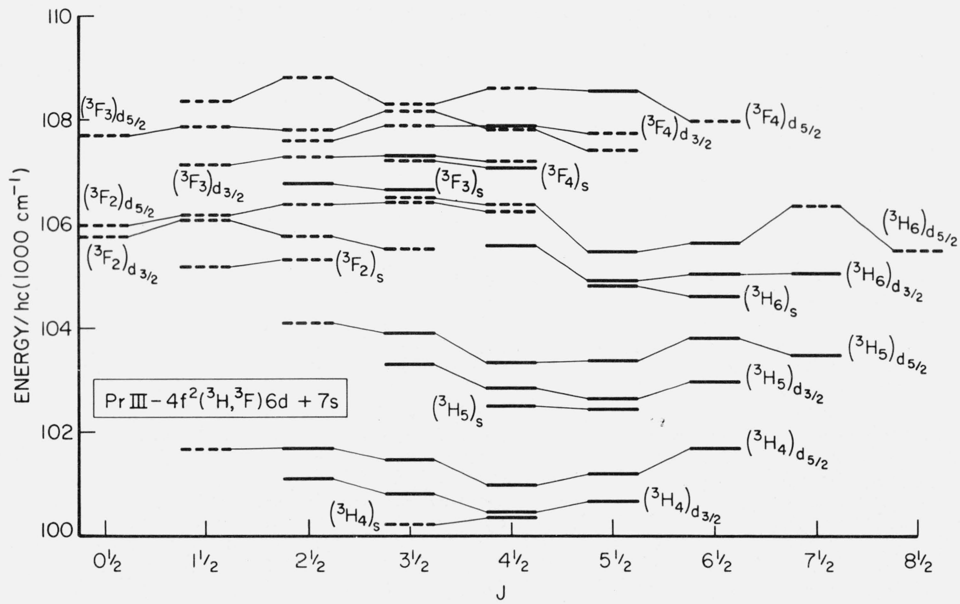

FIGURE 3. *Energy levels of the* 4f^{2}6d *and* 4f^{2}7s *configurations of* Pr III designated in J_1j-coupling. The $4f^2$ core levels are given in parentheses followed by subscript d or s for the $6d$ or $7s$ configurations.

Levels not observed are represented by dashed lines at their calculated positions.

4.4. The $4f^28s$ Configuration

Only a few high-lying levels were found by adding the vacuum ultraviolet lines of Pr III to the $4f^26p$ group. These were characterized by the strict adherence of the observed lines to core level selection rules in J_1j-coupling. They were therefore either $4f^27d$ or $4f^28s$ levels. Their pair structure suggested the latter configuration and I attempted to fit them accordingly.

Here again, only levels based on the ^{3}H and ^{3}F core levels were found. Therefore, the same fixed conditions on $4f^2$ core parameters were used as for $4f^26d$ and $4f^27s$. The results of least squares fitting of the remaining parameters are given in table IX. The free core parameters E^3 and ζ_{4f} are practically identical to those found for $4f^26d$ and $4f^27s$. Also, the parameter $G^3(fs)$ shows the same fractional increase from the Ce III value as does the same parameter of $4f^27s$ and $4f^26s$. These results strongly support the interpretation of these levels as $4f^28s$.

TABLE IX. *Fitted parameter values and associated standard errors for the* 4f^{2}7s *and* 4f^{2}8s *configurations of* Pr III *in units of* cm^{-1}.

Parameters	Pr III		Pr III	
	$4f^27s$		$4f^28s$	
A	107226	±32	135946	±8
$E^1(f^2)$	4950	Fixed E^1/E^3	4936	Fixed E^1/E^3
E^2	22.9	Fixed E^2/E^3	22.8	Fixed E^2/E^3
E^3	482	±2	480.3	±0.7
α	23	Fixed	23	Fixed
γ	−56	Fixed	−56	Fixed
$G^3(fs)$	590	±110	350	±28
ζ_f	768	±6	761	±1
rms error in calculated levels	19 cm^{-1}		7 cm^{-1}	

5. The Ionization Energy

The present extension of the analysis of Pr III provides a three member $4f^2ns$ series ($n=6, 7, 8$) which is suitable for a determination of the ionization energy of this ion.

The levels based on the ^{3}H core term are available in the three configurations, and the purity of these levels is above 90 percent (in contrast to the ^{3}F levels). Therefore, for the series terms I used the center of gravity of the levels built on the ^{3}H core. For the missing level in $4f^2(^3\text{H})7s$ and $4f^2(^3\text{H})8s$ the calculated position was substituted. The centers of gravity of

$4f^2(^3H)6s$, $7s$, and $8s$ and the fitted effective principal quantum numbers are:

Configuration	c.g. (cm^{-1})	n^*
$4f^2(^3H)6s$	31137	2.6045
$4f^2(^3H)7s$	102738	3.6535
$4f^2(^3H)8s$	131507	4.6732

The Ritz formula to which these values are fitted is:

$$T=-9R/(n-3.2959-6.8432\times 10^{-7}\ T)^2.$$

To reduce the limit of this series to the lowest limit corresponding to the ionization energy, the center of gravity of the ^{3}H term of $4f^2$ observed in Pr IV [18] was subtracted. This gives the value of 174284 cm^{-1} for the lowest series limit of Pr III.

The error resulting from the use of this three term series may be estimated from La III [24], where a four term *ns* series ($n=6$, 7, 8, 9) is known. The ionization energy derived from this series agrees with those obtained with *nf* and *ng* series to within 10 cm^{-1}. By using only the first three terms of the *ns* series in La III one obtains a value for the ionization energy differing from that given by the four term series by -115 cm^{-1}. I therefore added an equivalent fractional amount to the calculated ionization energy of Pr III obtained from the three term series and estimate the uncertainty to be equal to this quantity. This gives the ionization energy of Pr III as 21.625 eV (174420 cm^{-1}) with an estimated uncertainty of 0.016 eV (130 cm^{-1}).

This procedure for estimating the correction for the quadratic term in the quantum defect is valid if series of this kind generally exhibit the same behavior. It was noted in reference 10 that an examination of the curves of the quantum defect (σ) versus term energy (T) for the *ns* series of a large number of alkali-like atoms shows that their shapes are similar, and for the same period are practically identical (see table IV of ref. 10). Therefore, the use of the four-member series in La III to estimate the error in the ionization energy derived from a three-member series in Pr III is reasonable.

I am pleased to thank Prof. R. Chabbal, Director of Laboratoire Aimé Cotton, Orsay, France, for making available the excellent computer programs for calculating energy matrices written by Y. Bordarier and A. Carlier of his staff. My first experience with these programs was gained at his laboratory where part of the present theoretical analysis was carried out.

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Dr. V. Kaufman generously contributed the exposures of the Pr spark made with the Eagle vacuum spectrograph.

6. References

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TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
2103.455	3	47540.8	$23844_{9/2} - 71385^{\circ}_{7/2}$
2102.907	20	47553.2	
2102.492	3	47562.6	
2101.877	10	47576.5	
2101.778	100	47578.8	$23442_{11/2} - 71021^{\circ}_{9/2}$
2101.651	2	47581.6	
2099.948	5	47620.2	$25409_{7/2} - 73029^{\circ}_{9/2}$
2099.757	50	47624.6	
2099.757	50	47624.6	$29267_{5/2} - 76892^{\circ}_{3/2}$
2099.402	200	47632.6	$16135_{7/2} - 63768^{\circ}_{7/2}$
2098.974	3	47642.3	
2098.903	20	47643.9	$20848_{5/2} - 68492^{\circ}_{7/2}$
2098.523	100	47652.6	$21755_{11/2} - 69408^{\circ}_{11/2}$
2098.275	5	47658.2	$26446_{7/2} - 74105^{\circ}_{5/2}$
2097.806	100	47668.8	$17627_{9/2} - 65295^{\circ}_{7/2}$
2097.601	1000	47673.5	$12846_{9/2} - 60520^{\circ}_{7/2}$
2097.513	500	47675.5	$14859_{11/2} - 62535^{\circ}_{9/2}$
2097.284	20	47680.7	$18241_{11/2} - 65922^{\circ}_{11/2}$
2097.234	100	47681.8	$14558_{9/2} - 62240^{\circ}_{11/2}$
2097.160	40	47683.5	$21294_{7/2} - 68978^{\circ}_{5/2}$
2097.075	5	47685.5	$24309_{3/2} - 71994^{\circ}_{5/2}$
2096.985	5	47687.5	
2096.890	5	47689.7	$27604_{9/2} - 75294^{\circ}_{7/2}$
2096.832	200	47691.0	$18990_{7/2} - 66681^{\circ}_{5/2}$
2096.787	6	47692.0	$21294_{7/2} - 68987^{\circ}_{7/2}$
2096.496	400	47698.6	$14859_{11/2} - 62558^{\circ}_{11/2}$
2094.953	20	47733.8	$23651_{7/2} - 71385^{\circ}_{7/2}$
2094.676	400	47740.1	$19308_{11/2} - 67049^{\circ}_{9/2}$
2094.155	4000	47752.0	$17113_{13/2} - 64865^{\circ}_{11/2}$
2093.909	5	47757.6	
2093.424	40	47768.6	
2092.509	10	47789.5	
2091.826	30	47805.1	$20160_{3/2} - 67965^{\circ}_{3/2}$
2091.758	20	47806.7	$19872_{7/2} - 67679^{\circ}_{7/2}$
2091.411	4000	47814.6	$18921_{15/2} - 66735^{\circ}_{13/2}$
2091.238	100	47818.6	$14859_{11/2} - 62678^{\circ}_{13/2}$
2090.153	20	47843.4	$21294_{7/2} - 69138^{\circ}_{9/2}$
2089.744	1	47852.7	$23532_{5/2} - 71385^{\circ}_{7/2}$
2089.473	10	47859.0	$18063_{9/2} - 65922^{\circ}_{11/2}$
2089.306	5	47862.8	$18990_{7/2} - 66852^{\circ}_{7/2}$
2088.848	2	47873.3	$21535_{9/2} - 69408^{\circ}_{11/2}$
2088.769	10	47875.1	$32288_{3/2} - 80164^{\circ}_{3/2}$
2088.632	10	47878.2	
2088.346	400	47884.8	$16516_{7/2} - 64401^{\circ}_{5/2}$
2088.042	5	47891.8	$23844_{9/2} - 71736^{\circ}_{11/2}$
2087.387	4	47906.8	$18241_{11/2} - 66148^{\circ}_{13/2}$
2087.300	4	47908.8	
2087.200	4	47911.1	
2086.712	10	47922.3	$20315_{9/2} - 68238^{\circ}_{11/2}$
2085.246	30	47956.0	$28936_{3/2} - 76892^{\circ}_{3/2}$
2085.148	2	47958.2	
2084.954	10	47962.7	
2084.699	3	47968.5	$23532_{5/2} - 71501^{\circ}_{3/2}$
			$25409_{7/2} - 73378^{\circ}_{7/2}$
2084.344	60	47976.7	$14558_{9/2} - 62535^{\circ}_{9/2}$
2083.504	1	47996.1	$25033_{9/2} - 73029^{\circ}_{9/2}$
2083.412	1	47998.2	$19872_{7/2} - 67870^{\circ}_{9/2}$
2083.123	400	48004.8	$13352_{11/2} - 61357^{\circ}_{9/2}$
2082.879	2	48010.5	
2082.810	3	48012.1	$21418_{5/2} - 69431^{\circ}_{7/2}$
2082.653	3	48015.7	
2081.788	2	48035.6	$27604_{9/2} - 75640^{\circ}_{11/2}$
2080.866	1	48056.9	
2080.280	30	48070.4	$21611_{5/2} - 69681^{\circ}_{5/2}$
2079.497	100	48088.6	$23647_{13/2} - 71736^{\circ}_{11/2}$
2079.441	300	48089.8	$19308_{11/2} - 67398^{\circ}_{9/2}$
2079.020	1	48099.6	$16135_{7/2} - 64235^{\circ}_{9/2}$
2078.645	20	48108.3	$27452_{5/2} - 75560^{\circ}_{5/2}$
2078.489	20	48111.9	$31254_{7/2} - 79366^{\circ}_{5/2}$
2078.426	3	48113.3	
2077.544	60	48133.8	$23844_{9/2} - 71978^{\circ}_{7/2}$
2077.450	40	48135.9	$21294_{7/2} - 69431^{\circ}_{7/2}$
2077.337	3	48138.6	$20848_{5/2} - 68987^{\circ}_{7/2}$
2076.841	200	48150.0	$23442_{11/2} - 71592^{\circ}_{9/2}$
2076.505	3	48157.8	$27604_{9/2} - 75762^{\circ}_{9/2}$
2076.358	100	48161.2	$45805_{9/2} - 93967^{\circ}_{7/2}$
2075.991	300	48169.8	$19700_{11/2} - 67870^{\circ}_{9/2}$
2075.747	500	48175.4	$15045_{5/2} - 63221^{\circ}_{3/2}$
2074.851	5	48196.2	
2073.739	20	48222.1	$21755_{11/2} - 69978^{\circ}_{11/2}$
2073.462	200	48228.5	$20315_{9/2} - 68544^{\circ}_{9/2}$
2073.215	3	48234.3	
2072.886	10	48241.9	$24788_{9/2} - 73029^{\circ}_{9/2}$
2072.580	15	48249.0	
2072.534	400	48250.1	$18990_{7/2} - 67240^{\circ}_{7/2}$
2071.991	80	48262.8	$21418_{5/2} - 69681^{\circ}_{5/2}$
2071.533	5	48273.4	$22747_{9/2} - 71021^{\circ}_{9/2}$
2070.768	50	48291.3	$15525_{11/2} - 63816^{\circ}_{11/2}$
2070.649	200	48294.0	$23442_{11/2} - 71736^{\circ}_{11/2}$
2070.338	50	48301.3	$16516_{7/2} - 64817^{\circ}_{5/2}$
2070.042	400	48308.2	$17627_{9/2} - 65935^{\circ}_{7/2}$
2069.258	50	48326.5	$23651_{7/2} - 71978^{\circ}_{7/2}$
2068.559	30	48342.8	$23651_{7/2} - 71994^{\circ}_{5/2}$
2068.261	200	48349.8	$39870_{9/2} - 88220^{\circ}_{9/2}$
2067.712	200	48362.6	$15454_{13/2} - 63816^{\circ}_{11/2}$
2067.034	200	48378.5	
2066.270	10	48396.4	
2065.895	300	48405.2	$18990_{7/2} - 67395^{\circ}_{5/2}$
2065.177	5	48422.0	$27138_{7/2} - 75560^{\circ}_{5/2}$
2064.736	1000	48432.3	$17534_{15/2} - 65967^{\circ}_{13/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
2064.291	2	48442.8	$21535_{9/2} - 69978^{\circ}_{11/2}$	2048.425	10	48818.0	$20160_{3/2} - 68978^{\circ}_{5/2}$
2064.176	10	48445.5	$23532_{5/2} - 71978^{\circ}_{7/2}$	2048.148	100	48824.6	$19700_{11/2} - 68525^{\circ}_{11/2}$
2063.966	5	48450.4	$23050_{3/2} - 71501^{\circ}_{3/2}$	2047.788	20	48833.2	$20848_{5/2} - 69681^{\circ}_{5/2}$
2063.765	2	48455.1		2047.369	80	48843.2	$19700_{11/2} - 68544^{\circ}_{9/2}$
2063.592	1	48459.2	$19872_{7/2} - 68331^{\circ}_{7/2}$	2047.331	1	48844.1	
2063.478	3	48461.9	$23532_{5/2} - 71994^{\circ}_{5/2}$	2047.208	2	48847.0	$26446_{7/2} - 75294^{\circ}_{7/2}$
2063.161	4	48469.3	$18211_{5/2} - 66681^{\circ}_{5/2}$	2046.923	70	48853.8	$17113_{13/2} - 65967^{\circ}_{13/2}$
2062.870	200	48476.2	$27138_{7/2} - 75614^{\circ}_{5/2}$	2046.754	10	48857.8	$22527_{7/2} - 71385^{\circ}_{7/2}$
2062.457	200	48485.9	$20315_{9/2} - 68801^{\circ}_{7/2}$	2046.692	20	48859.3	$29835_{9/2} - 78694^{\circ}_{11/2}$
			$23050_{3/2} - 71536^{\circ}_{5/2}$	2046.390	10	48866.5	
2061.421	80	48510.2	$12846_{9/2} - 61357^{\circ}_{9/2}$	2045.914	10	48877.9	$19360_{13/2} - 68238^{\circ}_{11/2}$
2060.746	20	48526.1		2045.564	2	48886.3	
2060.636	10	48528.7	$25934_{5/2} - 74463^{\circ}_{3/2}$	2045.465	200	48888.6	$13352_{11/2} - 62240^{\circ}_{11/2}$
2060.569	30	48530.3	$15045_{5/2} - 63576^{\circ}_{5/2}$	2044.686	10	48907.3	$24470_{7/2} - 73378^{\circ}_{7/2}$
2060.054	1	48542.4		2044.070	1	48922.0	
2059.891	10	48546.2		2043.773	500	48929.1	$19872_{7/2} - 68801^{\circ}_{7/2}$
2059.245	4000	48561.5	$19308_{11/2} - 67870^{\circ}_{9/2}$	2043.103	50	48945.2	$19360_{13/2} - 68305^{\circ}_{15/2}$
2058.796	60	48572.1		2042.616	400	48956.8	$14859_{11/2} - 63816^{\circ}_{11/2}$
2058.663	30	48575.2	$25033_{9/2} - 73609^{\circ}_{11/2}$	2041.925	2	48973.4	
2058.371	10	48582.1	$35828_{9/2} - 84410^{\circ}_{9/2}$	2039.381	200	49034.5	$14558_{9/2} - 63593^{\circ}_{9/2}$
2058.090	5	48588.7		2038.682	1	49051.3	
2057.554	100	48601.4	$35828_{9/2} - 84430^{\circ}_{7/2}$	2038.366	1	49058.9	
2057.042	10	48613.5	$17534_{15/2} - 66148^{\circ}_{13/2}$	2037.578	3	49077.9	
2056.771	5	48619.9	$19872_{7/2} - 68492^{\circ}_{7/2}$	2036.415	20 *c l*	49105.9	$19872_{7/2} - 68978^{\circ}_{5/2}$
2056.545	30	48625.2	$15525_{11/2} - 64150^{\circ}_{11/2}$	2036.103	1	49113.4	
2056.409	30	48628.4	$29835_{9/2} - 78463^{\circ}_{7/2}$	2036.061	100	49114.4	$19872_{7/2} - 68987^{\circ}_{7/2}$
2056.326	100	48630.4	$30505_{11/2} - 79136^{\circ}_{13/2}$	2035.210	10	49135.0	
2054.597	50	48671.4	$20315_{9/2} - 68987^{\circ}_{7/2}$	2034.894	100	49142.6	$21238_{13/2} - 70381^{\circ}_{13/2}$
2054.509	1000	48673.4	$14558_{9/2} - 63232^{\circ}_{7/2}$	2034.290	1	49157.2	$18241_{11/2} - 67398^{\circ}_{9/2}$
2054.168	200	48681.5	$16135_{7/2} - 64817^{\circ}_{5/2}$	2034.186	7	49159.7	$16135_{7/2} - 65295^{\circ}_{7/2}$
2053.815	10	48689.9	$15525_{11/2} - 64215^{\circ}_{13/2}$	2033.950	2000	49165.4	$19360_{13/2} - 68525^{\circ}_{11/2}$
2053.531	1000	48696.6	$15454_{13/2} - 64150^{\circ}_{11/2}$	2033.719	10	49171.0	
2052.953	2000	48710.3	$13352_{11/2} - 62062^{\circ}_{9/2}$	2033.478	40	49176.8	$18063_{9/2} - 67240^{\circ}_{7/2}$
			$15525_{11/2} - 64235^{\circ}_{9/2}$	2033.207	200	49183.4	$13352_{11/2} - 62535^{\circ}_{9/2}$
2052.434	2	48722.6	$15045_{5/2} - 63768^{\circ}_{7/2}$				$18211_{5/2} - 67395^{\circ}_{5/2}$
2052.198	3	48728.2		2033.129	50	49185.3	$23844_{9/2} - 73029^{\circ}_{9/2}$
2052.131	3	48729.8		2033.015	100	49188.0	$17113_{13/2} - 66301^{\circ}_{15/2}$
2052.078	10	48731.1	$18211_{5/2} - 66943^{\circ}_{5/2}$	2032.480	200	49201.0	$17534_{15/2} - 66735^{\circ}_{13/2}$
2052.045	1	48731.9		2032.253	400	49206.5	$13352_{11/2} - 62558^{\circ}_{11/2}$
2051.988	100	48733.2	$14859_{11/2} - 63593^{\circ}_{9/2}$	2032.117	1000	49209.8	$14558_{9/2} - 63768^{\circ}_{7/2}$
2051.736	200	48739.2	$21238_{13/2} - 69978^{\circ}_{11/2}$	2031.865	400	49215.9	$12846_{9/2} - 62062^{\circ}_{9/2}$
2050.969	20	48757.4		2031.558	1	49223.3	$22277_{3/2} - 71501^{\circ}_{3/2}$
2050.911	10	48758.8	$12846_{9/2} - 61605^{\circ}_{7/2}$	2031.455	400	49225.8	$17627_{9/2} - 66852^{\circ}_{7/2}$
2050.812	400	48761.2	$15454_{13/2} - 64215^{\circ}_{13/2}$	2031.256	10	49230.6	$22747_{9/2} - 71978^{\circ}_{7/2}$
2050.587	200	48766.5	$17534_{15/2} - 66301^{\circ}_{15/2}$	2030.131	100	49257.9	$14558_{9/2} - 63816^{\circ}_{11/2}$
2050.036	20	48779.6	$16516_{7/2} - 65295^{\circ}_{7/2}$	2029.983	2	49261.5	
2049.624	20	48789.4	$18063_{9/2} - 66852^{\circ}_{7/2}$	2029.814	7	49265.6	$19872_{7/2} - 69138^{\circ}_{9/2}$
2048.865	400	48807.5	$18241_{11/2} - 67049^{\circ}_{9/2}$	2029.694	2	49268.5	
2048.798	100	48809.1	$17113_{13/2} - 65922^{\circ}_{11/2}$	2029.540	20	49272.2	$35137_{3/2} - 84409^{\circ}_{3/2}$
2048.630	1	48813.1		2029.192	300	49280.7	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
2028.959	2	49286.4					$17627_{9/2} - 67398^{\circ}_{9/2}$
2028.926	5	49287.2	$44679_{7/2} - 93967^{\circ}_{7/2}$	2009.107	40	49773.4	$16135_{7/2} - 65909^{\circ}_{5/2}$
2028.780	100	49290.7	$14859_{11/2} - 64150^{\circ}_{11/2}$	2008.066	10	49799.2	$16135_{7/2} - 65935^{\circ}_{7/2}$
2028.209	40	49304.6	$22080_{7/2} - 71385^{\circ}_{7/2}$	2007.738	20	49807.3	$18063_{9/2} - 67870^{\circ}_{9/2}$
2027.315	3	49326.3	$13352_{11/2} - 62678^{\circ}_{13/2}$	2006.763	1	49831.5	
2027.194	40	49329.3		2006.565	30	49836.4	$21755_{11/2} - 71592^{\circ}_{9/2}$
2027.102	300	49331.5	$15525_{11/2} - 64857^{\circ}_{9/2}$	2006.072	10	49848.7	
2026.948	10	49335.3	$18063_{9/2} - 67398^{\circ}_{9/2}$	2005.817	30	49855.0	$30505_{11/2} - 80360^{\circ}_{11/2}$
2026.694	10	49341.4	$18990_{7/2} - 68331^{\circ}_{7/2}$	2004.416	10	49889.8	$21611_{5/2} - 71501^{\circ}_{3/2}$
2026.007	30 *c l*	49358.2		2003.908	20	49902.5	
2025.296	30	49375.5	$14859_{11/2} - 64235^{\circ}_{9/2}$	2003.001	10	49925.1	$21611_{5/2} - 71536^{\circ}_{5/2}$
2024.954	100	49383.8	$18921_{15/2} - 68305^{\circ}_{15/2}$	2002.296	2	49942.7	
2024.812	2	49387.3		2001.839	1	49954.1	
2024.573	20 *c l*	49393.1	$16516_{7/2} - 65909^{\circ}_{5/2}$	2001.548	10	49961.3	$23647_{13/2} - 73609^{\circ}_{11/2}$
2024.540	400	49393.9	$12846_{9/2} - 62240^{\circ}_{11/2}$	2001.441	40	49964.0	
2024.298	70	49399.8		2001.049	5	49973.8	$28720_{9/2} - 78694^{\circ}_{11/2}$
2023.848	10	49410.8	$15454_{13/2} - 64865^{\circ}_{11/2}$	2000.784	2	49980.4	$21755_{11/2} - 71736^{\circ}_{11/2}$
2023.390	10	49422.0	$17627_{9/2} - 67049^{\circ}_{9/2}$	2000.587	200	49985.3	$19700_{11/2} - 69686^{\circ}_{9/2}$
2023.005	200	49431.4	$29263_{13/2} - 78694^{\circ}_{11/2}$	2000.462	20	49988.4	$18990_{7/2} - 68978^{\circ}_{5/2}$
2022.766	70	49437.3	$19700_{11/2} - 69138^{\circ}_{9/2}$	2000.116	400	49997.1	$14859_{11/2} - 64857^{\circ}_{9/2}$
2022.370	3	49446.9					$18990_{7/2} - 68987^{\circ}_{7/2}$
2022.027	1	49455.3	$22080_{7/2} - 71536^{\circ}_{5/2}$	1999.902	30	50002.4	$24461_{5/2} - 74463^{\circ}_{3/2}$
2021.544	50	49467.1	$22527_{7/2} - 71994^{\circ}_{5/2}$	1999.795	100	50005.1	$14859_{11/2} - 64865^{\circ}_{11/2}$
2021.249	1	49474.4		1998.905	30	50027.4	
2020.778	10	49485.9	$21535_{9/2} - 71021^{\circ}_{9/2}$	1998.598	10	50035.1	
2018.512	1	49541.4		1998.301	1	50042.5	
2018.385	10	49544.6	$26095_{11/2} - 75640^{\circ}_{11/2}$	1998.064	400	50048.4	$19360_{13/2} - 69408^{\circ}_{11/2}$
2017.745	30	49560.3	$29835_{9/2} - 79395^{\circ}_{7/2}$	1997.912	20	50052.2	$17627_{9/2} - 67679^{\circ}_{7/2}$
2016.711	100	49585.7		1996.715	30	50082.3	$21418_{5/2} - 71501^{\circ}_{3/2}$
2016.637	2	49587.5	$23442_{11/2} - 73029^{\circ}_{9/2}$	1996.423	3	50089.6	
2016.463	1	49591.8	$14558_{9/2} - 64150^{\circ}_{11/2}$	1996.023	5 *c l*	50099.6	$19308_{11/2} - 69408^{\circ}_{11/2}$
2015.591	100	49613.2	$17627_{9/2} - 67240^{\circ}_{7/2}$	1995.989	10	50100.5	
2015.488	200	49615.8	$18063_{9/2} - 67679^{\circ}_{7/2}$	1995.216	100	50119.9	$18211_{5/2} - 68331^{\circ}_{7/2}$
2015.267	20	49621.2	$29267_{5/2} - 78889^{\circ}_{3/2}$	1994.856	1	50128.9	
2015.214	100	49622.5	$17113_{13/2} - 66735^{\circ}_{13/2}$	1994.692	400	50133.0	$18241_{11/2} - 68374^{\circ}_{9/2}$
2014.946	100	49629.1	$18241_{11/2} - 67870^{\circ}_{9/2}$	1994.027	20	50149.8	$31254_{7/2} - 81404^{\circ}_{5/2}$
2014.405	2	49642.4		1993.422	300 *c l*	50165.0	$16516_{7/2} - 66681^{\circ}_{5/2}$
2013.897	5	49655.0		1993.346	100 *c l*	50166.9	$23442_{11/2} - 73609^{\circ}_{11/2}$
2013.015	100	49676.7	$14558_{9/2} - 64235^{\circ}_{9/2}$	1991.983	10	50201.2	$21535_{9/2} - 71736^{\circ}_{11/2}$
2012.896	30	49679.7	$25934_{5/2} - 75614^{\circ}_{5/2}$	1991.836	6	50204.9	$25409_{7/2} - 75614^{\circ}_{5/2}$
2011.593	100	49711.8	$12846_{9/2} - 62558^{\circ}_{11/2}$	1991.622	60	50210.3	
2011.388	3	49716.9	$22277_{3/2} - 71994^{\circ}_{5/2}$	1991.509	30	50213.2	$24250_{3/2} - 74463^{\circ}_{3/2}$
2011.008	1	49726.3	$21294_{7/2} - 71021^{\circ}_{9/2}$	1991.049	1	50224.8	
			$23651_{7/2} - 73378^{\circ}_{7/2}$	1990.959	3	50227.0	
2010.696	20	49734.0		1989.646	50	50260.2	$25033_{9/2} - 75294^{\circ}_{7/2}$
2010.339	80	49742.8	$28720_{9/2} - 78463^{\circ}_{7/2}$	1989.319	300	50268.5	$18063_{9/2} - 68331^{\circ}_{7/2}$
2009.905	80	49753.6	$18211_{5/2} - 67965^{\circ}_{3/2}$	1988.770	6	50282.3	$22747_{9/2} - 73029^{\circ}_{9/2}$
2009.579	40	49761.7		1988.707	2	50283.9	$18241_{11/2} - 68525^{\circ}_{11/2}$
2009.467	5	49764.4	$23844_{9/2} - 73609^{\circ}_{11/2}$	1988.247	10	50295.6	
2009.177	40	49771.6	$15045_{5/2} - 64817^{\circ}_{5/2}$	1988.139	300	50298.3	$14558_{9/2} - 64857^{\circ}_{9/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1987.631	40	50311.2	$18063_{9/2} - 68374^{\circ}_{9/2}$
1987.542	2	50313.4	
1985.995	5	50352.6	$21148_{3/2} - 71501^{\circ}_{3/2}$
			$25409_{7/2} - 75762^{\circ}_{9/2}$
1985.023	1	50377.2	$19308_{11/2} - 69686^{\circ}_{9/2}$
1984.870	10	50381.1	
1984.698	20	50385.5	$12846_{9/2} - 63232^{\circ}_{7/2}$
1984.380	4	50393.6	
1984.348	2 *c l*	50394.4	
1984.250	50	50396.9	$15525_{11/2} - 65922^{\circ}_{11/2}$
1983.311	10	50420.7	$14558_{9/2} - 64979^{\circ}_{7/2}$
1983.066	2	50427.0	$16516_{7/2} - 66943^{\circ}_{5/2}$
1982.981	300	50429.1	$18063_{9/2} - 68492^{\circ}_{7/2}$
1982.785	2	50434.1	$23175_{13/2} - 73609^{\circ}_{11/2}$
1982.492	5	50441.6	$15525_{11/2} - 65967^{\circ}_{13/2}$
1982.428	1	50443.2	$21535_{9/2} - 71978^{\circ}_{7/2}$
1981.580	100	50464.8	$13352_{11/2} - 63816^{\circ}_{11/2}$
1981.449	2	50468.1	$15454_{13/2} - 65922^{\circ}_{11/2}$
1981.140	4	50476.0	
1980.950	10	50480.8	$18063_{9/2} - 68544^{\circ}_{9/2}$
1980.867	2	50483.0	$30505_{11/2} - 80988^{\circ}_{13/2}$
1980.287	200	50497.7	
1980.191	100*h*	50500.2	$38448_{9/2} - 88948^{\circ}_{9/2}$
1979.745	5 *b l*	50511.6	
1979.692	20	50512.9	$15454_{13/2} - 65967^{\circ}_{13/2}$
1978.427	200	50545.2	$16135_{7/2} - 66681^{\circ}_{5/2}$
1975.850	2	50611.1	$17627_{9/2} - 68238^{\circ}_{11/2}$
1975.782	4	50612.9	
1975.582	200	50618.0	$19360_{13/2} - 69978^{\circ}_{11/2}$
1975.424	3	50622.0	
1973.849	3	50662.4	
1973.590	2	50669.1	$19308_{11/2} - 69978^{\circ}_{11/2}$
1973.367	10	50674.8	$28720_{9/2} - 79395^{\circ}_{7/2}$
1972.857	10	50687.9	$20848_{5/2} - 71536^{\circ}_{5/2}$
1972.617	5	50694.1	$15454_{13/2} - 66148^{\circ}_{13/2}$
1972.200	30	50704.8	$17627_{9/2} - 68331^{\circ}_{7/2}$
1971.913	2	50712.2	
1971.730	15	50716.9	$16135_{7/2} - 66852^{\circ}_{7/2}$
1971.636	200	50719.3	
1971.287	4	50728.3	$25033_{9/2} - 75762^{\circ}_{9/2}$
1971.248	4	50729.3	
1970.573	80	50746.7	$12846_{9/2} - 63593^{\circ}_{9/2}$
1970.091	1	50759.1	$39870_{9/2} - 90629^{\circ}_{9/2}$
1969.791	40	50766.8	$18211_{5/2} - 68978^{\circ}_{5/2}$
1969.650	20	50770.4	$17534_{15/2} - 68305^{\circ}_{15/2}$
1969.468	10	50775.1	$18211_{5/2} - 68987^{\circ}_{7/2}$
1968.530	60	50799.3	
1968.227	40	50807.2	$16135_{7/2} - 66943^{\circ}_{5/2}$
1967.608	10	50823.1	$24470_{7/2} - 75294^{\circ}_{7/2}$
1967.447	20	50827.3	
1967.373	1	50829.2	
1967.233	1	50832.8	$24461_{5/2} - 75294^{\circ}_{7/2}$
1966.710	2	50846.3	$21148_{3/2} - 71994^{\circ}_{5/2}$
1966.502	3	50851.7	$24788_{9/2} - 75640^{\circ}_{11/2}$
1966.208	40	50859.3	$27604_{9/2} - 78463^{\circ}_{7/2}$
			$36652_{5/2} - 87511^{\circ}_{7/2}$
1965.970	80	50865.5	$17627_{9/2} - 68492^{\circ}_{7/2}$
1965.346	1	50881.6	
1963.974	2	50917.2	$17627_{9/2} - 68544^{\circ}_{9/2}$
1963.911	2	50918.8	
1963.786	100 *c l*	50922.0	$12846_{9/2} - 63768^{\circ}_{7/2}$
1963.731	20 *c l*	50923.5	$18063_{9/2} - 68987^{\circ}_{7/2}$
1963.401	100	50932.0	
1962.747	4	50949.0	$22080_{7/2} - 73029^{\circ}_{9/2}$
1962.418	10	50957.5	$25934_{5/2} - 76892^{\circ}_{3/2}$
1961.929	200	50970.2	$12846_{9/2} - 63816^{\circ}_{11/2}$
1961.265	3	50987.5	
1960.735	10	51001.3	
1959.961	30	51021.4	$19360_{13/2} - 70381^{\circ}_{13/2}$
1959.874	10 *b l*	51023.7	$45807_{5/2} - 96830^{\circ}_{7/2}$
1958.687	2	51054.6	$23050_{3/2} - 74105^{\circ}_{5/2}$
1958.387	100	51062.4	$14859_{11/2} - 65922^{\circ}_{11/2}$
1958.053	2	51071.1	
1958.001	1	51072.5	$19308_{11/2} - 70381^{\circ}_{13/2}$
1957.908	3	51074.9	$18063_{9/2} - 69138^{\circ}_{9/2}$
1957.338	1	51089.8	$24470_{7/2} - 75560^{\circ}_{5/2}$
1957.073	6	51096.7	
1957.039	3	51097.6	$29263_{13/2} - 80360^{\circ}_{11/2}$
1956.957	20	51099.7	$24461_{5/2} - 75560^{\circ}_{5/2}$
1956.672	5	51107.2	$14859_{11/2} - 65967^{\circ}_{13/2}$
1955.992	15	51124.9	$17113_{13/2} - 68238^{\circ}_{11/2}$
1955.521	3	51137.3	
1955.268	3	51143.9	$24470_{7/2} - 75614^{\circ}_{5/2}$
1954.535	10	51163.1	$16516_{7/2} - 67679^{\circ}_{7/2}$
1954.455	60*w*	51165.2	
1954.386	20	51167.0	$18241_{11/2} - 69408^{\circ}_{11/2}$
1954.196	40	51171.9	
1954.092	2	51174.7	$17627_{9/2} - 68801^{\circ}_{7/2}$
1953.531	20	51189.4	
1953.321	5	51194.9	
1952.395	1	51219.1	$18211_{5/2} - 69431^{\circ}_{7/2}$
1951.968	2	51230.3	
1951.018	200 *b l*	51255.3	
1950.864	1	51259.3	$16135_{7/2} - 67395^{\circ}_{5/2}$
1949.759	100	51288.4	$14859_{11/2} - 66148^{\circ}_{13/2}$
1949.156	60	51304.3	$12846_{9/2} - 64150^{\circ}_{11/2}$
1948.364	10	51325.1	$27138_{7/2} - 78463^{\circ}_{7/2}$
1947.036	10	51360.1	$17627_{9/2} - 68987^{\circ}_{7/2}$
1946.900	1	51363.7	$14558_{9/2} - 65922^{\circ}_{11/2}$
1946.830	3	51365.6	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1946.417	80	51376.4	$14558_{9/2} - 65935^{\circ}_{7/2}$
1945.646	2	51396.8	
1945.053	1	51412.5	$17113_{13/2} - 68525^{\circ}_{11/2}$
1943.835	8	51444.7	$18241_{11/2} - 69686^{\circ}_{9/2}$
1943.650	4	51449.6	$23844_{9/2} - 75294^{\circ}_{7/2}$
1943.293	10	51459.0	
1943.248	30	51460.2	$18921_{15/2} - 70381^{\circ}_{13/2}$
1941.939	2	51494.9	$21535_{9/2} - 73029^{\circ}_{9/2}$
1941.556	100	51505.1	$13352_{11/2} - 64857^{\circ}_{9/2}$
1941.250	2	51513.2	$13352_{11/2} - 64865^{\circ}_{11/2}$
1940.930	2	51521.7	
1940.853	5	51523.7	$15525_{11/2} - 67049^{\circ}_{9/2}$
1940.770	2	51525.9	
1939.299	100	51565.0	
1939.161	10	51568.7	
1937.726	20	51606.9	
1937.127	10	51622.8	$18063_{9/2} - 69686^{\circ}_{9/2}$
1936.659	40	51635.3	$15045_{5/2} - 66681^{\circ}_{5/2}$
1936.478	3	51640.1	$28720_{9/2} - 80360^{\circ}_{11/2}$
1936.375	1	51642.9	
1935.588	30	51663.9	$19872_{7/2} - 71536^{\circ}_{5/2}$
1935.290	1	51671.8	$38448_{9/2} - 90119^{\circ}_{11/2}$
1933.865	10	51709.9	$35801_{7/2} - 87511^{\circ}_{7/2}$
1933.775	100	51712.3	$19308_{11/2} - 71021^{\circ}_{9/2}$
1933.491	1	51719.9	$19872_{7/2} - 71592^{\circ}_{9/2}$
1932.872	8	51736.5	$18241_{11/2} - 69978^{\circ}_{11/2}$
1932.181	5 *b l*	51755.0	
1931.739	5	51766.8	$21611_{5/2} - 73378^{\circ}_{7/2}$
1931.368	1	51776.8	
1930.813	40	51791.6	
1930.349	10	51804.1	$17627_{9/2} - 69431^{\circ}_{7/2}$
1930.001	3	51813.4	
1929.920	20	51815.6	$16516_{7/2} - 68331^{\circ}_{7/2}$
1929.706	30	51821.4	$15045_{5/2} - 66867^{\circ}_{3/2}$
1928.246	7	51860.6	
1927.821	20	51872.0	
1927.774	20	51873.3	$15525_{11/2} - 67398^{\circ}_{9/2}$
1927.678	4	51875.9	$14859_{11/2} - 66735^{\circ}_{13/2}$
1927.095	300	51891.6	$19700_{11/2} - 71592^{\circ}_{9/2}$
1926.884	3	51897.3	$15045_{5/2} - 66943^{\circ}_{5/2}$
1925.579	3 *b l*	51932.4	
1925.184	10	51943.1	$27452_{5/2} - 79395^{\circ}_{7/2}$
1924.451	30	51962.9	$23651_{7/2} - 75614^{\circ}_{5/2}$
1923.365	300	51992.2	$23647_{13/2} - 75640^{\circ}_{11/2}$
1923.154	2	51997.9	
1922.689	200	52010.5	$12846_{9/2} - 64857^{\circ}_{9/2}$
1922.459	3	52016.7	$26446_{7/2} - 78463^{\circ}_{7/2}$
1922.394	1	52018.5	$12846_{9/2} - 64865^{\circ}_{11/2}$
1922.178	20	52024.3	$22080_{7/2} - 74105^{\circ}_{5/2}$
1922.047	10	52027.9	$16516_{7/2} - 68544^{\circ}_{9/2}$

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
			$23532_{5/2} - 75560^{\circ}_{5/2}$
1921.828	2	52033.8	
1921.763	50	52035.6	$19700_{11/2} - 71736^{\circ}_{11/2}$
1920.869	1	52059.8	
1919.639	1	52093.1	
1919.162	30	52106.1	$19872_{7/2} - 71978^{\circ}_{7/2}$
1918.562	100	52122.4	$19872_{7/2} - 71994^{\circ}_{5/2}$
1917.201	1	52159.4	
1916.741	4	52171.9	$31254_{7/2} - 83426^{\circ}_{5/2}$
1916.507	1	52178.3	
1916.106	50	52189.2	$14859_{11/2} - 67049^{\circ}_{9/2}$
1915.296	1	52211.2	
1914.681	2	52228.0	$27138_{7/2} - 79366^{\circ}_{5/2}$
1913.964	70	52247.6	
1913.622	1	52256.9	$27138_{7/2} - 79395^{\circ}_{7/2}$
1913.339	2	52264.6	
1913.284	100 *b l*	52266.2	
1912.698	5	52282.2	
1912.651	20	52283.4	$19308_{11/2} - 71592^{\circ}_{9/2}$
1911.251	3	52321.8	
1910.242	2	52349.4	$15045_{5/2} - 67395^{\circ}_{5/2}$
1910.093	1	52353.5	
1909.895	3	52358.9	$23050_{3/2} - 75409^{\circ}_{3/2}$
1909.471	200	52370.5	$21238_{13/2} - 73609^{\circ}_{11/2}$
1909.258	300	52376.4	$19360_{13/2} - 71736^{\circ}_{11/2}$
1907.956	4	52412.1	$25409_{7/2} - 77822^{\circ}_{5/2}$
1907.054	10	52436.9	
1906.750	10 *b l*	52445.3	
1906.126	2	52462.4	$16516_{7/2} - 68978^{\circ}_{5/2}$
1906.040	40	52464.8	$23175_{13/2} - 75640^{\circ}_{11/2}$
1905.819	20 *h*	52470.9	$16516_{7/2} - 68987^{\circ}_{7/2}$
1905.688	10	52474.5	
1904.981	1	52494.0	$21611_{5/2} - 74105^{\circ}_{5/2}$
1904.862	3	52497.2	
1904.625	1	52503.8	
1904.212	4	52515.2	
1903.356	60	52538.8	$14859_{11/2} - 67398^{\circ}_{9/2}$
1903.115	10 *c l*	52545.4	
1903.083	10 *c l*	52546.3	$18990_{7/2} - 71536^{\circ}_{5/2}$
1902.215	2	52570.3	$13352_{11/2} - 65922^{\circ}_{11/2}$
1901.979	4	52576.8	
1901.715	7	52584.1	
1900.811	5	52609.1	
1900.561	1	52616.0	
1899.627	1	52641.9	$24250_{3/2} - 76892^{\circ}_{3/2}$
1899.491	5	52645.7	
1898.200	80	52681.5	$14558_{9/2} - 67240^{\circ}_{7/2}$
1898.020	5	52686.5	$21418_{5/2} - 74105^{\circ}_{5/2}$
			$34825_{7/2} - 87511^{\circ}_{7/2}$
1897.082	1	52712.5	$15525_{11/2} - 68238^{\circ}_{11/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1896.430	6 *c l*	52730.6		1880.571	10	53175.3	
1896.409	2 *c l*	52731.2		1879.845	4	53195.9	$35024_{7/2} - 88220^{\circ}_{9/2}$
1896.290	1	52734.6		1879.786	4	53197.5	$30505_{11/2} - 83703^{\circ}_{13/2}$
1895.474	2	52757.2		1879.673	1	53200.7	
1895.146	1	52766.4	$22527_{7/2} - 75294^{\circ}_{7/2}$	1879.571	2 *c l*	53203.6	
1894.672	2	52779.6	$18241_{11/2} - 71021^{\circ}_{9/2}$	1879.542	5	53204.4	
1894.520	1	52783.8	$15454_{13/2} - 68238^{\circ}_{11/2}$	1879.235	20	53213.1	$22080_{7/2} - 75294^{\circ}_{7/2}$
1894.358	3	52788.3		1878.823	10	53224.8	
1893.864	3	52802.1		1878.459	20	53235.1	
1893.751	1	52805.2		1877.694	10	53256.8	$20848_{5/2} - 74105^{\circ}_{5/2}$
1893.569	3	52810.3	$21294_{7/2} - 74105^{\circ}_{5/2}$	1877.280	5	53268.5	$17113_{13/2} - 70381^{\circ}_{13/2}$
1893.334	1 *h*	52816.9		1876.933	100 *b l*	53278.4	
1893.181	10 *h*	52821.2		1876.675	2	53285.7	$15045_{5/2} - 68331^{\circ}_{7/2}$
1892.506	60	52840.0	$14558_{9/2} - 67398^{\circ}_{9/2}$	1876.549	20	53289.3	$18211_{5/2} - 71501^{\circ}_{3/2}$
1892.266	1	52846.7	$17534_{15/2} - 70381^{\circ}_{13/2}$	1875.754	8	53311.9	$14558_{9/2} - 67870^{\circ}_{9/2}$
1892.183	5	52849.0	$15525_{11/2} - 68374^{\circ}_{9/2}$	1875.388	10	53322.3	$18063_{9/2} - 71385^{\circ}_{7/2}$
1892.050	4	52852.7	$21611_{5/2} - 74463^{\circ}_{3/2}$	1875.309	20	53324.6	$18211_{5/2} - 71536^{\circ}_{5/2}$
1891.609	2	52865.0	$17113_{13/2} - 69978^{\circ}_{11/2}$	1874.981	20	53333.9	
1890.948	5	52883.5		1874.079	60	53359.5	$23532_{5/2} - 76892^{\circ}_{3/2}$
1890.827	200	52886.9		1873.997	20	53361.9	
1890.665	2	52891.4		1873.914	5 *b l*	53364.2	
1889.832	2	52914.8	$16516_{7/2} - 69431^{\circ}_{7/2}$	1873.470	5	53376.9	
1889.674	60	52919.2		1873.434	7	53377.9	$14859_{11/2} - 68238^{\circ}_{11/2}$
1888.294	30	52957.8	$18063_{9/2} - 71021^{\circ}_{9/2}$	1873.146	2	53386.1	
1887.490	1	52980.4	$27380_{11/2} - 80360^{\circ}_{11/2}$	1872.737	200	53397.8	
1887.180	10	52989.1		1871.878	20	53422.3	
1886.792	4	53000.0	$15525_{11/2} - 68525^{\circ}_{11/2}$	1870.826	5	53452.3	
1886.624	10	53004.7	$18990_{7/2} - 71994^{\circ}_{5/2}$	1870.354	1	53465.8	
1886.491	7	53008.5		1869.803	2	53481.6	
1886.412	5	53010.7	$14859_{11/2} - 67870^{\circ}_{9/2}$	1868.246	1	53526.1	
1886.132	1	53018.6	$15525_{11/2} - 68544^{\circ}_{9/2}$	1867.982	5	53533.7	$22080_{7/2} - 75614^{\circ}_{5/2}$
1885.940	3	53024.0		1867.565	200	53545.7	$16135_{7/2} - 69681^{\circ}_{5/2}$
1885.869	4	53026.0		1867.224	5	53555.4	
1885.328	3	53041.2	$26095_{11/2} - 79136^{\circ}_{13/2}$	1866.957	5	53563.1	
1885.015	5	53050.0		1866.678	1	53571.1	$24250_{3/2} - 77822^{\circ}_{5/2}$
1884.653	3	53060.2		1866.179	30	53585.4	
1884.399	20	53067.3		1865.842	4	53595.1	
1884.152	10	53074.3		1865.698	5	53599.2	
1884.105	1	53075.6	$12846_{9/2} - 65922^{\circ}_{11/2}$	1865.530	10 *c l*	53604.1	
1883.789	3	53084.5		1865.503	10 *c l*	53604.8	
1883.700	50 *c l*	53087.0	$22527_{7/2} - 75614^{\circ}_{5/2}$	1865.232	20	53612.6	$15525_{11/2} - 69138^{\circ}_{9/2}$
1883.647	50 *c l*	53088.5	$12846_{9/2} - 65935^{\circ}_{7/2}$	1865.139	40	53615.3	$20848_{5/2} - 74463^{\circ}_{3/2}$
1883.315	2	53097.9		1865.061	2	53617.6	
1883.184	50	53101.6	$30505_{11/2} - 83607^{\circ}_{11/2}$	1864.141	50 *b l*	53644.0	
1883.007	1	53106.5		1863.670	20	53657.6	$35291_{9/2} - 88948^{\circ}_{9/2}$
1882.932	2	53108.7		1863.393	20	53665.5	$14859_{11/2} - 68525^{\circ}_{11/2}$
1882.843	3	53111.2		1863.347	5	53666.9	
1882.031	20	53134.1		1863.289	10	53668.5	
1881.224	500	53156.9	$25979_{15/2} - 79136^{\circ}_{13/2}$	1863.044	100	53675.6	$24788_{9/2} - 78463^{\circ}_{7/2}$
1880.919	10	53163.5	$16516_{7/2} - 69681^{\circ}_{5/2}$	1862.028	4 *h*	53704.9	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification[a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification[a]
1861.467	60	53721.1	$19308_{11/2}-73029^{\circ}_{9/2}$	1843.574	4	54242.5	
1861.040	10	53733.4		1843.356	10	54248.9	$19360_{13/2}-73609^{\circ}_{11/2}$
1860.876	30	53738.1		1842.950	10	54260.8	$21148_{3/2}-75409^{\circ}_{3/2}$
1860.257	10	53756.0	$15045_{5/2}-68801^{\circ}_{7/2}$	1842.789	200	54265.6	$21294_{7/2}-75560^{\circ}_{5/2}$
1860.167	100	53758.6	$17627_{9/2}-71385^{\circ}_{7/2}$				$26095_{11/2}-80360^{\circ}_{11/2}$
			$21535_{9/2}-75294^{\circ}_{7/2}$	1842.365	60	54278.1	$14859_{11/2}-69138^{\circ}_{9/2}$
1859.679	40*h*	53772.7	$14558_{9/2}-68331^{\circ}_{7/2}$	1842.235	5	54281.9	
1859.328	5	53782.9	$18211_{5/2}-71994^{\circ}_{5/2}$	1841.926	1	54291.0	$35828_{9/2}-90119^{\circ}_{11/2}$
1859.270	5	53784.6		1841.729	2	54296.8	
1858.198	10	53815.6	$14558_{9/2}-68374^{\circ}_{9/2}$	1841.514	6	54303.1	$20160_{3/2}-74463^{\circ}_{3/2}$
1857.791	5*w*	53827.4		1841.463	2	54304.6	
1857.615	5	53832.5		1841.311	2	54309.1	
1857.212	10	53844.1		1840.954	10 *c l*	54319.7	$21294_{7/2}-75614^{\circ}_{5/2}$
1857.044	1*h*	53849.0		1840.585	1	54330.6	
1856.931	1	53852.3		1840.136	3	54343.8	
1856.144	10	53875.1	$21418_{5/2}-75294^{\circ}_{7/2}$	1839.547	2	54361.2	
1856.053	10	53877.8		1838.456	200	54393.5	$12846_{9/2}-67240^{\circ}_{7/2}$
1855.878	10 *c l*	53882.8	$15525_{11/2}-69408^{\circ}_{11/2}$	1838.198	50	54401.1	$21238_{13/2}-75640^{\circ}_{11/2}$
1855.601	2	53890.9		1837.984	20	54407.4	
1855.511	10*h*	53893.5		1837.352	3	54426.2	
1855.117	3	53905.0	$30505_{11/2}-84410^{\circ}_{9/2}$	1837.311	1	54427.4	
1855.004	30	53908.2	$19700_{11/2}-73609^{\circ}_{11/2}$	1837.189	2	54431.0	
1854.181	5 *c l*	53932.2		1837.074	6	54434.4	
1853.958	10*h*	53938.6		1836.887	3	54439.9	
1853.754	1	53944.6	$20160_{3/2}-74105^{\circ}_{5/2}$	1836.705	3	54445.3	$20848_{5/2}-75294^{\circ}_{7/2}$
1853.326	4	53957.0	$25409_{7/2}-79366^{\circ}_{5/2}$	1836.635	5	54447.4	
1853.288	4	53958.2		1836.471	7	54452.3	$15525_{11/2}-69978^{\circ}_{11/2}$
1853.078	4	53964.3		1835.696	2	54475.2	
1852.481	2	53981.7		1835.657	1	54476.4	
1852.409	2*h*	53983.8		1835.219	1	54489.4	
1851.891	1	53998.8	$21294_{7/2}-75294^{\circ}_{7/2}$	1834.398	8	54513.8	
1850.099	8	54051.2	$31254_{7/2}-85306^{\circ}_{5/2}$	1833.240	100	54548.2	
1849.381	10	54072.1		1833.120	100	54551.8	
1849.277	2	54075.2		1832.466	2	54571.3	
1848.358	4	54102.1		1832.331	15	54575.3	$29835_{9/2}-84410^{\circ}_{9/2}$
1848.161	2	54107.8		1831.264	4	54607.1	
1847.484	10	54127.7		1831.212	8	54608.6	
1847.308	10 *b l*	54132.8		1830.872	50	54618.8	$23844_{9/2}-78463^{\circ}_{7/2}$
1847.196	20 *c l*	54136.1		1830.727	1	54623.1	$17113_{13/2}-71736^{\circ}_{11/2}$
1847.167	2	54137.0		1830.593	100*h*	54627.1	
1847.014	10	54141.4		1830.311	20	54635.5	$15045_{7/2}-69681^{\circ}_{5/2}$
1846.935	20	54143.8		1829.742	10*h*	54652.5	
1846.836	40	54146.6		1829.313	100*h*	54665.3	
1846.378	20	54160.1		1828.849	5 *b l*	54679.2	
1846.187	6	54165.7		1828.589	1	54687.0	
1845.896	1	54174.2		1828.196	2	54698.7	$78694^{\circ}_{11/2}-133393_{13/2}$
1844.951	2	54202.0		1828.045	2	54703.2	
1844.862	3	54204.6		1827.758	4	54711.8	
1844.590	1	54212.6		1826.966	10	54735.6	
1843.910	20	54232.6	$19872_{7/2}-74105^{\circ}_{5/2}$	1825.989	2	54764.8	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1825.792	1	54770.8		1798.347	20	55606.6	
1825.215	2	54788.1	$18241_{11/2} - 73029^{\circ}_{9/2}$	1797.273	20	55639.8	
1823.960	3	54825.8		1797.085	20	55645.7	$12846_{9/2} - 68492^{\circ}_{7/2}$
1823.855	15	54828.9	$35291_{9/2} - 90119^{\circ}_{11/2}$	1797.011	1	55648.0	
1823.703	60	54833.5		1795.721	2	55687.9	
1823.561	30	54837.8		1795.662	10	55689.8	$28720_{9/2} - 84410^{\circ}_{9/2}$
1822.640	2	54865.5		1794.822	10	55715.8	$22747_{9/2} - 78463^{\circ}_{7/2}$
1822.514	20	54869.3	$16516_{7/2} - 71385^{\circ}_{7/2}$	1794.614	40 *h*	55722.3	
1821.782	4	54891.3		1794.164	1	55736.3	
1821.451	8	54901.3		1793.973	40	55742.2	$19872_{7/2} - 75614^{\circ}_{5/2}$
1821.333	1	54904.8		1793.695	100	55750.8	
1820.860	50	54919.1		1793.502	40	55756.8	
1820.296	4	54936.1		1792.983	10	55773.0	
1819.595	30	54957.3	$26446_{7/2} - 81404^{\circ}_{5/2}$	1792.794	3	55778.8	
1819.292	15	54966.4	$18063_{9/2} - 73029^{\circ}_{9/2}$	1792.569	1	55785.9	$13352_{11/2} - 69138^{\circ}_{5/2}$
1819.259	10	54967.4		1792.101	1	55800.4	
1818.913	10	54977.9		1791.938	30	55805.5	
1818.031	10 *b l*	55004.6		1791.690	80	55813.2	
1817.401	3	55023.6		1791.274	2	55826.2	
1817.344	7	55025.4		1790.071	2	55863.7	
1817.023	1	55035.1		1790.027	3	55865.1	
1816.643	400	55046.6	$23647_{13/2} - 78694^{\circ}_{11/2}$	1789.955	1	55867.3	
1816.484	2	55051.4		1789.656	5	55876.7	
1815.721	30	55074.5		1789.247	1	55889.4	$19872_{7/2} - 75762^{\circ}_{9/2}$
1815.025	4	55095.7		1789.129	1	55893.1	$18211_{5/2} - 74105^{\circ}_{5/2}$
1814.295	40	55117.8	$14859_{11/2} - 69978^{\circ}_{11/2}$	1788.462	2	55914.0	$36640_{7/2} - 92554^{\circ}_{5/2}$
1812.375	20	55176.2		1787.770	3	55935.6	$22527_{7/2} - 78463^{\circ}_{7/2}$
1811.894	200*w*	55190.9		1787.635	1	55939.8	
1810.775	50	55225.0		1787.154	15	55954.9	$12846_{9/2} - 68801^{\circ}_{7/2}$
1810.611	3	55230.0		1786.964	4	55960.8	$23175_{13/2} - 79136^{\circ}_{13/2}$
1809.556	4	55262.2	$23050_{3/2} - 78312^{\circ}_{1/2}$	1786.691	10 *h*	55969.4	
1808.516	15	55293.9	$22527_{7/2} - 77822^{\circ}_{5/2}$	1786.141	70	55986.6	
1808.106	30	55306.5		1785.885	10	55994.6	$25409_{7/2} - 81404^{\circ}_{5/2}$
1807.913	4	55312.4		1785.330	1	56012.0	
1807.776	1	55316.6		1780.963	10 *b l*	56149.4	
1805.481	5	55386.9		1780.596	5	56161.0	$14859_{11/2} - 71021^{\circ}_{9/2}$
1804.775	40	55408.6		1780.210	10	56173.1	
1804.354	10	55421.5	$19872_{7/2} - 75294^{\circ}_{7/2}$	1779.460	4	56196.8	
1803.399	2	55450.8		1779.025	2	56210.6	$21611_{5/2} - 77822^{\circ}_{5/2}$
1803.231	3 *b l*	55456.0		1778.732	1	56219.8	
1803.100	3 *b l*	55460.0		1778.422	1	56229.6	
1802.430	20 *b l*	55480.6		1777.716	4	56251.9	$18211_{5/2} - 74463^{\circ}_{3/2}$
1802.292	20	55484.9	$12846_{9/2} - 68331^{\circ}_{7/2}$	1777.452	2	56260.3	
1802.186	5	55488.2	$23647_{13/2} - 79136^{\circ}_{13/2}$	1776.879	20	56278.4	
1801.964	1	55495.0		1776.515	15 *h*	56290.0	
1801.172	100	55519.4	$23175_{13/2} - 78694^{\circ}_{11/2}$	1774.491	5	56354.2	
			$38448_{9/2} - 93967^{\circ}_{7/2}$	1774.257	1	56361.6	
1800.902	20	55527.7	$12846_{9/2} - 68374^{\circ}_{9/2}$	1773.023	7	56400.8	
1800.839	10	55529.7		1772.390	1	56421.0	$38726_{7/2} - 95147^{\circ}_{9/2}$
1799.453	1	55572.4		1772.129	3	56429.3	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1771.958	4	56434.7		1740.056	1	57469.4	
1771.680	1	56443.6		1739.840	200	57476.6	
1771.545	15	56447.9		1738.971	30	57505.3	
1771.483	10	56449.9		1737.972	5*h*	57538.3	
1771.328	4	56454.8		1736.996	10	57570.6	
1769.398	100	56516.4	$23844_{9/2} - 80360^{\circ}_{11/2}$	1736.747	5	57578.9	
1769.064	20	56527.1	$21294_{7/2} - 77822^{\circ}_{5/2}$	1736.646	200	57582.2	
1768.618	7	56541.3		1735.801	4	57610.3	
1768.479	10	56545.8		1735.757	1	57611.8	
1768.114	5	56557.4		1734.029	2	57669.2	$13352_{11/2} - 71021^{\circ}_{9/2}$
1766.432	3	56611.3	$22277_{3/2} - 78889^{\circ}_{3/2}$	1732.382	20	57724.0	$25979_{15/2} - 83703^{\circ}_{13/2}$
1765.543	2	56639.8		1731.526	2	57752.5	$23651_{7/2} - 81404^{\circ}_{5/2}$
1765.299	1	56647.6	$22747_{9/2} - 79395^{\circ}_{7/2}$	1731.442	2	57755.3	$21611_{5/2} - 79366^{\circ}_{5/2}$
1765.087	4	56654.4	$36642_{13/2} - 93296^{\circ}_{11/2}$	1729.702	3	57813.4	$23175_{13/2} - 80988^{\circ}_{13/2}$
1764.859	10*h*	56661.7		1728.302	1	57860.3	$21535_{9/2} - 79395^{\circ}_{7/2}$
1763.122	20	56717.6		1727.281	1	57894.4	
1763.005	1	56721.3		1727.194	1	57897.4	$21238_{13/2} - 79136_{13/2}$
1762.665	7	56732.3	$14859_{11/2} - 71592^{\circ}_{9/2}$	1725.553	3*b l*	57952.4	
1761.668	20	56764.4		1724.116	1	58000.7	
1761.052	2	56784.2		1723.641	10	58016.7	
1760.859	10	56790.5		1722.693	2	58048.6	
1760.518	10*h*	56801.5		1722.011	15	58071.6	$21294_{7/2} - 79366^{\circ}_{5/2}$
1759.916	1	56820.9		1721.800	1	58078.8	
1759.318	30	56840.2		1721.473	1	58089.8	
1759.278	10*c l*	56841.5		1721.102	5*h*	58102.3	
1758.351	5	56871.5		1720.034	2	58138.4	
1758.277	1	56873.9		1719.940	4	58141.6	
1758.196	7	56876.5	$14859_{11/2} - 71736^{\circ}_{11/2}$	1717.770	200	58215.0	$30733_{11/2} - 88948^{\circ}_{9/2}$
1755.522	20	56963.1		1717.152	1	58236.0	
1755.445	4	56965.6	$31254_{7/2} - 88220^{\circ}_{9/2}$	1715.471	5	58293.0	
1754.934	10*h*	56982.2		1713.147	4	58372.1	
1754.583	200	56993.6		1712.848	60*h*	58382.3	$38448_{9/2} - 96830^{\circ}_{7/2}$
1753.297	10	57035.4		1712.381	1	58398.2	
1750.486	5*c l*	57127.0		1712.058	1	58409.2	
1750.462	5*c l*	57127.8	$71978^{\circ}_{7/2} - 129106_{9/2}$	1711.408	2*h*	58431.4	
1749.160	2	57170.3	$35384_{5/2} - 92554^{\circ}_{5/2}$	1710.139	2	58474.8	
1748.330	5	57197.4		1709.377	5*h*	58500.8	
1747.949	100	57209.9		1707.514	1	58564.7	$24461_{5/2} - 83025^{\circ}_{3/2}$
1746.225	1	57266.4		1706.743	10	58591.1	$19872_{7/2} - 78463^{\circ}_{7/2}$
1745.879	3	57277.7	$21611_{5/2} - 78889^{\circ}_{3/2}$	1705.705	50*h*	58626.8	$28885_{9/2} - 87511^{\circ}_{7/2}$
1745.474	10*h*	57291.0		1702.266	1	58745.2	$21418_{5/2} - 80164^{\circ}_{3/2}$
1745.329	2	57295.8		1700.952	20	58790.6	$28720_{9/2} - 87511^{\circ}_{7/2}$
1744.571	4	57320.7		1700.128	1	58819.1	$24788_{9/2} - 83607^{\circ}_{11/2}$
1743.957	3	57340.9	$23647_{13/2} - 80988^{\circ}_{13/2}$	1699.416	3	58843.7	
1743.758	1	57347.4		1698.689	10	58868.9	
1743.377	400	57359.9	$32760_{13/2} - 90119^{\circ}_{11/2}$	1697.558	3	58908.1	
1742.574	2	57386.4		1696.079	15	58959.5	
1742.073	10	57402.9	$18211_{5/2} - 75614^{\circ}_{5/2}$	1694.896	1	59000.7	$25409_{7/2} - 84410^{\circ}_{9/2}$
1741.563	1	57419.7	$14558_{9/2} - 71978^{\circ}_{7/2}$	1694.547	100	59012.8	$25979_{15/2} - 84992^{\circ}_{15/2}$
1740.471	1	57455.7	$21238_{13/2} - 78694^{\circ}_{11/2}$	1692.766	30	59074.9	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1691.726	10	59111.2		1521.236	10	65736.0	
1689.800	2	59178.6		1520.128	1	65783.9	$13352_{11/2} - 79136^\circ_{13/2}$
1687.085	1	59273.8		1520.030	3	65788.2	
1685.905	1	59315.3	$20848_{5/2} - 80164^\circ_{3/2}$	1519.247	100	65822.1	
1685.033	2	59346.0	$35801_{7/2} - 95147^\circ_{9/2}$	1518.966	4*h*	65834.2	
1684.583	1	59361.9		1518.655	2	65847.7	$12846_{9/2} - 78694^\circ_{11/2}$
1683.887	5	59386.4	$30733_{11/2} - 90119^\circ_{11/2}$	1518.560	2	65851.9	$15045_{5/2} - 80897^\circ_{3/2}$
1681.073	1*h*	59485.8		1518.374	1	65859.9	
1680.841	8	59494.0	$19872_{7/2} - 79366^\circ_{5/2}$	1518.212	1	65867.0	
1679.872	1	59528.3		1518.142	40*h*	65870.0	
1677.314	20*h*	59619.1		1517.622	20*h*	65892.6	
1676.900	30	59633.8	$71592^\circ_{9/2} - 131226_{9/2}$	1517.441	10	65900.4	$21611_{5/2} - 87511^\circ_{7/2}$
1676.363	3	59653.0		1517.341	100*h*	65904.8	
1674.074	4*h*	59734.5		1516.753	5	65930.3	$65295^\circ_{7/2} - 131226_{9/2}$
1673.663	1	59749.2		1516.533	40*w*	65939.9	
1672.914	4	59775.9	$19360_{13/2} - 79136^\circ_{13/2}$	1516.365	1	65947.2	
1671.427	20	59829.1		1515.694	15	65976.4	$21535_{9/2} - 87511^\circ_{7/2}$
1667.796	4	59959.4	$23647_{13/2} - 83607^\circ_{11/2}$	1514.893	50 *b l*	66011.3	
1666.198	7	60016.9		1513.746	10*h*	66061.3	
1666.118	1	60019.8		1513.602	5	66067.6	
1665.129	8	60055.4	$23647_{13/2} - 83703^\circ_{13/2}$	1513.530	5*w*	66070.7	$18921_{15/2} - 84992^\circ_{15/2}$
1663.639	1	60109.2		1512.678	1	66107.9	$26446_{7/2} - 92554^\circ_{5/2}$
1660.981	3	60205.4	$71021^\circ_{9/2} - 131226_{9/2}$	1512.632	1	66109.9	
1657.206	2	60342.5		1512.206	100*w*	66128.6	$14859_{11/2} - 80988^\circ_{13/2}$
1654.182	3	60452.8	$18241_{11/2} - 78694^\circ_{11/2}$	1511.988	10	66138.1	
1653.351	2	60483.2		1511.274	4	66169.3	$18241_{11/2} - 84410^\circ_{9/2}$
1649.187	400*w*	60635.9		1510.693	10*h*	66194.8	
1648.067	3	60677.2	$18211_{5/2} - 78889^\circ_{3/2}$	1509.987	4	66225.7	
1645.043	1	60788.7		1509.565	50*h*	66244.2	
1630.147	5*h*	61344.2	$23647_{13/2} - 84992^\circ_{15/2}$	1509.155	2 *c l*	66262.2	$28885_{9/2} - 95147^\circ_{9/2}$
1627.434	200*h*	61446.4	$35384_{5/2} - 96830^\circ_{7/2}$	1508.867	7*w*	66274.9	$23844_{9/2} - 90119^\circ_{11/2}$
1624.969	1	61539.6	$35291_{9/2} - 96830^\circ_{7/2}$	1508.327	3	66298.6	
1622.622	1	61628.6	$19360_{13/2} - 80988^\circ_{13/2}$	1508.074	20*h*	66309.7	
1621.248	100	61680.9	$33466_{11/2} - 95147^\circ_{9/2}$	1506.863	3	66363.0	$27604_{9/2} - 93967^\circ_{7/2}$
1614.502	2	61938.6		1506.805	1	66365.6	$44903_{5/2} - 111268^\circ_{3/2}$
1611.809	100 *c l*	62042.1		1506.425	2	66382.3	
1604.766	1	62314.4		1505.774	3	66411.0	
1594.572	10	62712.7	$31254_{7/2} - 93967^\circ_{7/2}$	1505.654	300	66416.3	
1589.553	2	62910.8		1505.409	5	66427.1	$28720_{9/2} - 95147^\circ_{9/2}$
1580.105	3	63286.9	$29267_{5/2} - 92554^\circ_{5/2}$	1505.329	20*h*	66430.7	
1579.856	1	63296.9		1504.783	30	66454.8	$67049^\circ_{9/2} - 133503_{11/2}$
1574.825	1	63499.1		1504.761	400*w*	66455.7	
1573.388	10*h*	63557.1	$28885_{9/2} - 92441^\circ_{7/2}$	1504.662	2	66460.1	$69408^\circ_{11/2} - 135868_{9/2}$
1569.341	1	63721.0	$28720_{9/2} - 92441^\circ_{7/2}$	1504.398	400 *b l*	66471.8	$23647_{13/2} - 90119^\circ_{11/2}$
1531.171	5	65309.5		1504.269	1	66477.5	
1529.851	1	65365.8	$18241_{11/2} - 83607^\circ_{11/2}$	1504.086	8	66485.6	$46673_{7/2} - 113158^\circ_{9/2}$
1522.489	2*h*	65681.9		1503.607	20	66506.7	$25934_{5/2} - 92441^\circ_{7/2}$
1522.241	100*h*	65692.6	$27604_{9/2} - 93296^\circ_{11/2}$	1503.422	100 *c l*	66514.9	$27452_{5/2} - 93967^\circ_{7/2}$
			$22527_{7/2} - 88220^\circ_{9/2}$	1502.967	10	66535.1	
1521.417	3	65728.2		1502.807	2	66542.1	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1502.688	10	66547.4	$62558^{\circ}_{11/2}-129106_{9/2}$	1487.561	15	67224.1	
1502.435	3	66558.6		1487.137	100*h*	67243.3	
1502.305	10	66564.4		1486.827	1	67257.3	
1501.676	10	66592.3		1486.630	20*h*	67266.2	
1501.054	20	66619.8	$25934_{5/2}-92554^{\circ}_{5/2}$	1486.538	5	67270.4	
1500.901	3*w*	66626.6		1485.425	200	67320.8	
1500.675	10	66636.7		1484.932	20	67343.2	$68525^{\circ}_{11/2}-135868_{9/2}$
1500.445	20*h*	66646.9		1484.661	50	67355.4	$66148^{\circ}_{13/2}-133503_{11/2}$
1500.080	50	66663.1	$44679_{7/2}-111342^{\circ}_{7/2}$	1484.298	300*w*	67371.9	$22747_{9/2}-90119^{\circ}_{11/2}$
1499.756	50*w*	66677.5	$23442_{11/2}-90119^{\circ}_{11/2}$	1484.211	3	67375.9	
1499.586	3*h*	66685.1	$21535_{9/2}-88220^{\circ}_{9/2}$	1484.046	3	67383.4	$63816^{\circ}_{11/2}-131200_{11/2}$
1499.112	2	66706.2		1483.825	7	67393.4	
1498.566	4	66730.5	$69138^{\circ}_{9/2}-135868_{9/2}$	1483.598	10	67403.7	
1498.426	1	66736.7		1483.508	5	67407.8	$25033_{9/2}-92441^{\circ}_{7/2}$
1497.724	1	66768.0	$66735^{\circ}_{13/2}-133503_{11/2}$	1483.470	8	67409.5	$63816^{\circ}_{11/2}-131226_{9/2}$
1497.352	3	66784.6	$23844_{9/2}-90629^{\circ}_{9/2}$	1483.400	10	67412.7	
1496.880	7	66805.6		1482.662	3	67446.2	
1496.831	8	66807.8		1482.585	10	67449.8	
1496.247	20	66833.9		1482.548	1	67451.4	
1495.999	200	66845.0		1482.417	20	67457.4	$17534_{15/2}-84992^{\circ}_{15/2}$
1495.547	30	66865.2	$62240^{\circ}_{11/2}-129106_{9/2}$	1482.127	10	67470.6	$65922^{\circ}_{11/2}-133393_{13/2}$
1495.506	7	66867.0		1481.704	3	67489.9	
1495.220	200	66879.8		1481.609	1	67494.2	$68374^{\circ}_{9/2}-135868_{9/2}$
1495.047	2*h*	66887.5		1481.475	7	67500.3	$61605^{\circ}_{7/2}-129106_{9/2}$
1494.944	20*h*	66892.1		1481.193	5	67513.1	
1494.747	10	66901.0	$68544^{\circ}_{9/2}-135445_{7/2}$	1481.123	5	67516.3	
1494.200	40*w*	66925.4	$21294_{7/2}-88220^{\circ}_{9/2}$	1481.035	40	67520.3	$26446_{7/2}-93967^{\circ}_{7/2}$
1493.724	4 *c l*	66946.8		1480.953	3	67524.1	
1493.694	10 *c l*	66948.1		1480.527	2	67543.5	$27604_{9/2}-95147^{\circ}_{9/2}$
1493.590	5	66952.8	$68492^{\circ}_{7/2}-135445_{7/2}$	1480.093	10*h*	67563.3	
1492.951	4	66981.4		1479.953	10	67569.7	
1492.874	60	66984.9	$64215^{\circ}_{13/2}-131200_{11/2}$	1479.887	40	67572.7	
1492.352	100*w*	67008.3	$13352_{11/2}-80360^{\circ}_{11/2}$	1479.849	2	67574.5	$67870^{\circ}_{9/2}-135445_{7/2}$
1491.830	3	67031.8	$25409_{7/2}-92441^{\circ}_{7/2}$	1479.695	20	67581.5	$65922^{\circ}_{11/2}-133503_{11/2}$
1491.713	10*h*	67037.0		1479.549	10 *b l*	67588.2	
1490.867	7	67075.1	$64150^{\circ}_{11/2}-131226_{9/2}$	1479.300	2	67599.5	
1490.494	50	67091.8	$66301^{\circ}_{15/2}-133393_{13/2}$	1479.136	10	67607.0	$63593^{\circ}_{9/2}-131200_{11/2}$
1490.431	2	67094.7		1479.083	20	67609.4	
1490.014	3*h*	67113.5	$68331^{\circ}_{7/2}-135445_{7/2}$	1478.974	2	67614.4	
1489.937	50*h*	67116.9		1478.835	5	67620.8	
1489.689	3	67128.1		1478.618	3	67630.7	$68238^{\circ}_{11/2}-135868_{9/2}$
1489.567	200	67133.6		1478.572	8	67632.8	$63593^{\circ}_{9/2}-131226_{9/2}$
1489.319	40	67144.8	$25409_{7/2}-92554^{\circ}_{5/2}$	1478.527	20	67634.9	
1489.187	4*h*	67150.7		1478.436	10	67639.0	$19872_{7/2}-87511^{\circ}_{7/2}$
1489.073	10*h*	67155.9		1478.324	20	67644.2	
1488.984	100*h*	67159.9		1478.253	10	67647.4	
1488.202	1	67195.2		1478.120	100	67653.5	$24788_{9/2}-92441^{\circ}_{7/2}$
1488.071	30	67201.1	$26095_{11/2}-93296^{\circ}_{11/2}$	1478.048	20	67656.8	
1487.843	20	67211.4		1477.977	20 *b l*	67660.0	
1487.723	8	67216.8		1477.650	8	67675.0	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1477.559	6	67679.2		1466.320	1	68197.9	
1477.506	3	67681.6		1466.011	1	68212.3	
1477.109	15	67699.8		1465.984	1	68213.6	
1477.046	7	67702.7		1465.899	2	68217.5	
1476.843	30	67712.0	$45844_{3/2} - 113556^{\circ}_{5/2}$	1465.216	2	68249.3	$15454_{13/2} - 83703^{\circ}_{13/2}$
1476.566	2	67724.7		1465.124	200	68253.6	
1476.516	10	67727.0		1465.021	200	68258.4	
1476.274	200	67738.1		1464.853	3	68266.2	
1475.801	4	67759.8		1464.742	5*b l*	68271.4	
1475.700	10	67764.4		1464.502	60*w*	68282.6	
1475.562	10	67770.8		1464.400	1	68287.3	
1475.508	20*h*	67773.3		1464.013	40	68305.4	
1475.411	200	67777.7		1463.825	100	68314.2	
1474.094	50	67838.3		1463.756	10	68317.4	
1474.013	100	67842.0		1463.554	400	68326.8	
1473.818	200*w*	67851.0		1463.332	200	68337.2	
1473.720	4*h*	67855.5		1463.233	400	68341.8	
1473.364	2	67871.9		1462.700	30	68366.7	
1473.155	2	67881.5	$22747_{9/2} - 90629^{\circ}_{9/2}$	1462.585	20	68372.1	
1472.995	1	67888.9		1462.155	50	68392.2	
1472.456	1	67913.7		1462.019	1	68398.6	
1472.332	20	67919.5		1461.616	100*h*	68417.4	
1472.142	1	67928.2		1461.504	1	68422.7	
1472.102	2	67930.1		1461.405	4	68427.3	
1471.895	3	67939.6		1461.218	2	68436.0	
1471.767	30	67945.5	$28885_{9/2} - 96830^{\circ}_{7/2}$	1460.632	2	68463.5	
1471.518	3	67957.0		1460.440	2	68472.5	
1471.255	5	67969.2		1460.223	1	68482.7	
1470.908	3	67985.2		1460.050	40	68490.8	
1470.805	80	67990.0		1459.674	40	68508.4	$24788_{9/2} - 93296^{\circ}_{11/2}$
1470.324	10	68012.2		1459.405	3	68521.1	
1470.261	20*b l*	68015.1		1459.339	100	68524.2	
1470.045	3*w*	68025.1		1459.257	2*h*	68528.0	$64865^{\circ}_{11/2} - 133393_{13/2}$
1469.887	2	68032.4	$25934_{5/2} - 93967^{\circ}_{7/2}$	1459.033	1	68538.5	
1469.649	2	68043.4		1458.771	8	68550.8	
1469.511	7	68049.8	$67395^{\circ}_{5/2} - 135445_{7/2}$	1458.701	2	68554.1	
1469.369	3	68056.4		1458.614	30*h*	68558.2	
1468.902	60	68078.1		1458.202	10	68577.6	
1468.779	10	68083.8	$24470_{7/2} - 92554^{\circ}_{5/2}$	1458.130	100	68581.0	
1468.573	5*w*	68093.3	$24461_{5/2} - 92554^{\circ}_{5/2}$	1457.894	2	68592.1	$66852^{\circ}_{7/2} - 135445_{7/2}$
1468.399	200	68101.4	$22527_{7/2} - 90629^{\circ}_{9/2}$	1457.784	10	68597.3	$23844_{9/2} - 92441^{\circ}_{7/2}$
1468.227	20	68109.3	$28720_{9/2} - 96830^{\circ}_{7/2}$	1457.512	30	68610.1	
1467.698	100*h*	68133.9		1457.433	4*h*	68613.8	
1467.646	3	68136.3		1457.357	3*h*	68617.4	
1467.595	10	68138.7		1457.257	5	68622.1	
1467.409	4	68147.3		1456.949	40	68636.6	
1467.247	3	68154.8		1456.787	1	68644.2	
1467.153	7	68159.2		1456.738	1	68646.5	$64857^{\circ}_{9/2} - 133503_{11/2}$
1467.081	10*h*	68162.6		1456.574	2	68654.2	
1466.971	2	68167.7		1455.583	30	68701.0	$26446_{7/2} - 95147^{\circ}_{9/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1454.957	400 *b l*	68730.6		1440.844	1 *h*	69403.8	
1454.832	4	68736.4		1440.733	10 *h*	69409.1	
1454.775	5	68739.2		1440.234	5	69433.2	
1454.602	5	68747.3	$46673_{7/2} - 115420^{\circ}_{7/2}$	1439.922	30	69448.2	$18063_{9/2} - 87511^{\circ}_{7/2}$
			$14859_{11/2} - 83607^{\circ}_{11/2}$	1439.540	100	69466.6	
1454.265	20	68763.2		1439.420	10 *h*	69472.4	
1454.029	40	68774.4		1438.925	2	69496.3	$24470_{7/2} - 93967^{\circ}_{7/2}$
1453.934	5	68778.9		1438.766	3	69504.0	$23050_{3/2} - 92554^{\circ}_{5/2}$
1453.705	7	68789.8	$16516_{7/2} - 85306^{\circ}_{5/2}$	1438.719	5	69506.3	$24461_{5/2} - 93967^{\circ}_{7/2}$
1453.541	15	68797.5		1438.532	20 *h*	69515.3	
1453.405	30	68803.9		1438.037	50 *h*	69539.2	
1453.094	20 *h*	68818.7		1437.871	1	69547.3	
1453.014	100 *h*	68822.5		1437.405	7	69569.8	
1452.887	40	68828.5		1435.977	10	69639.0	
1452.569	1	68843.6	$14859_{11/2} - 83703^{\circ}_{13/2}$	1434.845	40	69693.9	$45805_{9/2} - 115499^{\circ}_{9/2}$
1452.478	1	68847.8		1434.629	40 *h*	69704.4	
1452.352	400	68853.8		1434.540	5 *h*	69708.8	
1452.005	8 *h*	68870.3		1434.187	20 *h*	69725.9	
1451.783	100	68880.8	$21238_{13/2} - 90119^{\circ}_{11/2}$	1434.090	10 *h*	69730.6	
1451.358	300 *h*	68901.0		1433.936	20	69738.1	$25409_{7/2} - 95147^{\circ}_{9/2}$
1451.193	30	68908.8	$23532_{5/2} - 92441^{\circ}_{7/2}$	1432.971	5 *h*	69785.1	
1450.960	4 *h*	68919.9		1432.015	5 *h*	69831.7	
1450.500	2	68941.7		1431.711	5 *w*	69846.5	
1450.403	4	68946.4		1431.554	3	69854.1	$23442_{11/2} - 93296^{\circ}_{11/2}$
1450.241	10 *h*	68954.0		1431.244	20	69869.3	$61357^{\circ}_{9/2} - 131226_{9/2}$
1448.814	5	69022.0	$23532_{5/2} - 92554^{\circ}_{5/2}$	1431.103	40	69876.2	
1448.524	10 *h*	69035.8		1431.014	100	69880.5	
1448.168	100	69052.8	$26095_{11/2} - 95147^{\circ}_{9/2}$	1430.930	3	69884.6	$17627_{9/2} - 87511^{\circ}_{7/2}$
1447.963	4	69062.5		1430.543	5	69903.5	
1447.616	100	69079.1		1430.329	20	69914.0	$22527_{7/2} - 92441^{\circ}_{7/2}$
1447.301	3	69094.1	$21535_{9/2} - 90629^{\circ}_{9/2}$	1430.158	300	69922.3	
1446.361	1	69139.0	$48401_{3/2} - 117540^{\circ}_{3/2}$	1429.627	1	69948.3	
1445.822	50 *h*	69164.8		1428.703	3	69993.6	$45807_{5/2} - 115800^{\circ}_{5/2}$
1445.659	4	69172.6		1428.018	40	70027.1	$22527_{7/2} - 92554^{\circ}_{5/2}$
1445.517	300	69179.4	$24788_{9/2} - 93967^{\circ}_{7/2}$	1427.709	20	70042.3	
1445.279	2	69190.8		1427.561	3	70049.5	
1445.033	3 *h*	69202.6		1427.014	100	70076.4	
1444.551	50 *h*	69225.7		1426.067	100	70122.9	$23844_{9/2} - 93967^{\circ}_{7/2}$
1444.331	2	69236.2		1424.775	2	70186.5	
1444.106	20	69247.0		1424.001	1	70224.7	
1443.659	2 *h*	69268.4	$64235^{\circ}_{9/2} - 133503_{11/2}$	1423.653	5	70241.8	
1443.470	400	69277.5		1423.393	3	70254.7	
1443.005	1	69299.8	$18211_{5/2} - 87511^{\circ}_{7/2}$	1423.187	4 *h*	70264.8	
1442.865	3 *h*	69306.6		1423.114	2 *h*	70268.4	
1442.750	5 *h*	69312.1		1422.943	2	70276.9	$22277_{3/2} - 92554^{\circ}_{5/2}$
1442.290	10	69334.2	$21294_{7/2} - 90629^{\circ}_{9/2}$	1422.718	10	70288.0	
1442.085	7	69344.0		1422.551	10 *h*	70296.2	
1441.730	7	69361.1		1422.079	3 *h*	70319.6	
1441.388	20	69377.6	$27452_{5/2} - 96830^{\circ}_{7/2}$	1421.745	10	70336.1	
1440.948	20 *h*	69398.8		1421.636	20	70341.5	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1421.479	1	70349.3		1406.681	15	71089.3	
1421.262	100	70360.0	$24788_{9/2} - 95147^{\circ}_{9/2}$	1406.071	15	71120.2	$44679_{7/2} - 115800^{\circ}_{5/2}$
1420.795	15	70383.1	$26446_{7/2} - 96830^{\circ}_{7/2}$	1405.544	50	71146.8	$21294_{7/2} - 92441^{\circ}_{7/2}$
1420.334	5	70406.0		1405.434	2	71152.4	$62240^{\circ}_{11/2} - 133393_{13/2}$
1420.071	50*h*	70419.0	$19700_{11/2} - 90119^{\circ}_{11/2}$	1405.100	1	71169.3	
1420.021	10 *c l*	70421.5		1404.974	30	71175.7	
1418.966	7	70473.8	$22080_{7/2} - 92554^{\circ}_{5/2}$	1404.747	300	71187.2	
1418.477	2	70498.1		1404.102	20	71219.9	$22747_{9/2} - 93967^{\circ}_{7/2}$
1417.458	1	70548.8	$22747_{9/2} - 93296^{\circ}_{11/2}$	1403.981	300	71226.0	
1417.081	20	70567.6		1403.868	4	71231.8	
1416.779	20	70582.6		1403.598	60	71245.5	
1416.165	5	70613.2		1403.310	100	71260.1	$21294_{7/2} - 92554^{\circ}_{5/2}$
1415.874	1	70627.8	$64817^{\circ}_{5/2} - 135445_{7/2}$	1403.171	100	71267.2	
1415.756	300	70633.6		1402.907	40	71280.6	
1414.393	3	70701.7		1402.743	20	71288.9	$40205_{3/2} - 111494^{\circ}_{5/2}$
1414.230	2	70709.8		1402.599	3	71296.2	
1414.137	50	70714.5	$62678^{\circ}_{13/2} - 133393_{13/2}$	1402.458	8	71303.4	$23844_{9/2} - 95147^{\circ}_{9/2}$
1413.766	3	70733.1		1402.122	8	71320.5	$19308_{11/2} - 90629^{\circ}_{9/2}$
1413.674	10	70737.7		1402.047	100 *c l*	71324.3	
1413.359	5	70753.4		1402.030	30 *c l*	71325.2	
1413.235	3*h*	70759.6	$19360_{13/2} - 90119^{\circ}_{11/2}$	1401.774	3	71338.2	
1412.825	400	70780.2		1401.405	4	71357.0	
1412.655	5*h*	70788.7		1401.176	100	71368.6	
1412.492	3	70796.9		1400.611	20*h*	71397.4	
1412.297	20	70806.6	$60419^{\circ}_{11/2} - 131226_{9/2}$	1400.434	7	71406.4	$21148_{3/2} - 92554^{\circ}_{5/2}$
1412.087	10	70817.2		1400.359	7*h*	71410.3	
1411.924	20	70825.3	$62678^{\circ}_{13/2} - 133503_{11/2}$	1400.160	3	71420.4	$25409_{7/2} - 96830^{\circ}_{7/2}$
1411.819	20	70830.6	$21611_{5/2} - 92441^{\circ}_{7/2}$	1399.141	5	71472.4	$39870_{9/2} - 111342^{\circ}_{7/2}$
1411.732	100*h*	70835.0		1398.824	40	71488.6	
1411.399	10 *c l*	70851.7		1398.695	5	71495.2	
1411.372	3 *c l*	70853.0		1398.619	40	71499.1	
1411.184	2	70862.5		1397.919	2	71534.9	
1410.745	10	70884.5	$50647_{11/2} - 121532^{\circ}_{11/2}$	1397.770	4	71542.5	
1410.651	100	70889.3	$64979^{\circ}_{7/2} - 135868_{9/2}$	1397.421	100*h*	71560.4	
1410.528	10 *b l*	70895.4	$25934_{5/2} - 96830^{\circ}_{7/2}$	1397.344	20	71564.3	
1410.304	60	70906.7	$21535_{9/2} - 92441^{\circ}_{7/2}$	1397.227	5	71570.3	
1409.801	100*h*	70932.0	$58174^{\circ}_{9/2} - 129106_{9/2}$	1396.842	7	71590.0	
1409.708	5	70936.7		1396.444	50	71610.5	
1409.535	3	70945.4	$62558^{\circ}_{11/2} - 133503_{11/2}$	1396.219	20	71622.0	
1409.479	20	70948.2	$58158^{\circ}_{7/2} - 129106_{9/2}$	1395.722	2	71647.5	
1408.544	3	70995.3	$16516_{7/2} - 87511^{\circ}_{7/2}$	1395.658	5	71650.8	
1408.221	10	71011.6	$64857^{\circ}_{9/2} - 135868_{9/2}$	1395.383	8	71664.9	
1407.904	2	71027.6		1395.316	3	71668.4	
1407.773	20	71034.2	$60166^{\circ}_{9/2} - 131200_{11/2}$	1395.196	4*h*	71674.5	
1407.574	3	71044.2	$64401^{\circ}_{5/2} - 135445_{7/2}$	1394.784	10	71695.7	$45844_{3/2} - 117540^{\circ}_{3/2}$
1407.485	30*h*	71048.7		1394.718	20*h*	71699.1	
1407.352	6	71055.4		1394.585	60	71705.9	$20848_{5/2} - 92554^{\circ}_{5/2}$
1407.283	10 *c l*	71058.9	$13352_{11/2} - 84410^{\circ}_{9/2}$				$23442_{11/2} - 95147^{\circ}_{9/2}$
1407.260	10 *c l*	71060.1	$60166^{\circ}_{9/2} - 131226_{9/2}$	1394.540	2	71708.2	
1407.212	5	71062.5	$40205_{3/2} - 111268^{\circ}_{3/2}$	1394.435	3	71713.6	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1394.323	20	71719.4		1370.129	2	72985.8	$23844_{9/2} - 96830^{\circ}_{7/2}$
1393.964	20	71737.9		1368.661	100*h*	73064.1	
1393.905	4	71740.9		1367.730	5	73113.8	
1393.526	2	71760.4		1366.761	3	73165.7	
1393.452	100	71764.2		1366.522	3	73178.5	$23651_{7/2} - 96830^{\circ}_{7/2}$
1392.825	100	71796.5	$25033_{9/2} - 96830^{\circ}_{7/2}$	1366.392	200	73185.4	
1392.651	3	71805.5		1364.645	1	73279.1	
1392.367	1	71820.1		1364.382	2	73293.2	
1390.762	3	71903.0		1364.303	1	73297.5	$39725_{15/2} - 113023^{\circ}_{17/2}$
1390.367	100	71923.4		1363.020	2	73366.5	
1390.301	2	71926.9		1362.453	40*h*	73397.0	
1390.089	5	71937.8		1362.371	20*h*	73401.4	$44679_{7/2} - 118081^{\circ}_{9/2}$
1389.786	7	71953.5		1362.113	1	73415.4	$44903_{5/2} - 118318^{\circ}_{7/2}$
1389.588	100*h*	71963.8		1361.813	2	73431.5	
1389.240	7*w*	71981.8		1359.082	3*h*	73579.1	
1388.403	2	72025.2		1359.003	30*h*	73583.4	
1388.073	1	72042.3	$24788_{9/2} - 96830^{\circ}_{7/2}$	1358.233	2	73625.1	
1388.004	1	72045.9		1356.483	200*h*	73720.0	
1387.775	40	72057.8	$21238_{13/2} - 93296^{\circ}_{11/2}$	1356.355	2*h*	73727.0	$40098_{5/2} - 113825^{\circ}_{3/2}$
1387.268	4	72084.1	$16135_{7/2} - 88220^{\circ}_{9/2}$	1355.383	1	73779.9	
1387.136	2	72091.0		1355.214	3	73789.1	$44679_{7/2} - 118468^{\circ}_{9/2}$
1386.163	3	72141.6	$44903_{5/2} - 117044^{\circ}_{7/2}$	1354.815	2	73810.8	
1385.459	5*h*	72178.2		1353.997	2	73855.4	
1384.669	3	72219.4		1353.601	10*h*	73877.0	
1383.796	10	72265.0		1353.151	3	73901.6	
1383.656	300*h*	72272.3		1352.987	2	73910.5	$39870_{9/2} - 113780^{\circ}_{9/2}$
1383.608	2	72274.8	$45805_{9/2} - 118081^{\circ}_{9/2}$	1352.697	600	73926.4	
1382.351	2	72340.5		1352.511	300	73936.5	$19360_{13/2} - 93296^{\circ}_{11/2}$
1382.193	2	72348.8		1350.905	1	74024.4	
1382.045	1	72356.5	$45844_{3/2} - 118201^{\circ}_{3/2}$	1350.326	10*h*	74056.2	
1381.886	2	72364.9	$44679_{7/2} - 117044^{\circ}_{7/2}$	1350.171	20	74064.7	
1381.816	4	72368.5		1349.740	1	74088.3	$61357^{\circ}_{9/2} - 135445_{7/2}$
1381.446	100	72387.9	$18241_{11/2} - 90629^{\circ}_{9/2}$	1349.618	7	74095.0	$19872_{7/2} - 93967^{\circ}_{7/2}$
1381.209	10	72400.3	$22747_{9/2} - 95147^{\circ}_{9/2}$	1349.334	7	74110.6	$38785_{15/2} - 112896^{\circ}_{15/2}$
1380.107	40*h*	72458.2		1349.059	5	74125.7	
1379.958	3	72466.0	$45805_{9/2} - 118271^{\circ}_{11/2}$	1347.513	10	74210.8	$36670_{11/2} - 110881^{\circ}_{11/2}$
1378.385	1	72548.7	$38785_{15/2} - 111335^{\circ}_{15/2}$	1347.328	5	74221.0	
1377.992	15	72569.4	$19872_{7/2} - 92441^{\circ}_{7/2}$	1347.162	30	74230.1	$18211_{5/2} - 92441^{\circ}_{7/2}$
1377.425	20	72599.2		1345.174	100*h*	74339.8	$39485_{1/2} - 113825^{\circ}_{3/2}$
1376.770	15	72633.8	$38701_{13/2} - 111335^{\circ}_{15/2}$	1345.087	200*w*	74344.6	
1376.032	8	72672.7	$21294_{7/2} - 93967^{\circ}_{7/2}$	1344.704	5	74365.8	
1375.992	4	72674.8		1344.323	10	74386.9	
1375.847	1	72682.5	$19872_{7/2} - 92554^{\circ}_{5/2}$	1342.855	10	74468.2	$36642_{13/2} - 111110^{\circ}_{13/2}$
1374.618	20*h*	72747.5		1342.259	100	74501.3	
1374.199	2	72769.7		1338.810	4	74693.2	$36642_{13/2} - 111335^{\circ}_{15/2}$
1373.939	10	72783.4	$44903_{5/2} - 117686^{\circ}_{5/2}$	1338.568	2*h*	74706.7	
1372.124	3*h*	72879.7		1337.468	40*h*	74768.1	
1371.420	100*h*	72917.1		1335.134	100	74898.8	$38701_{13/2} - 113600^{\circ}_{13/2}$
1371.220	2*h*	72927.8		1334.983	10	74907.3	
1370.471	15	72967.6	$44679_{7/2} - 117647^{\circ}_{7/2}$	1334.811	2	74917.0	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1333.802	20*h*	74973.6	
1332.359	1	75054.8	$18241_{11/2}-93296^{\circ}_{11/2}$
1331.490	1	75103.8	$15525_{11/2}-90629^{\circ}_{9/2}$
1330.985	60	75132.3	$38701_{13/2}-113833^{\circ}_{15/2}$
1329.459	1	75218.6	
1328.452	30	75275.6	$38549_{1/2}-113825^{\circ}_{3/2}$
1328.207	5	75289.5	$45805_{9/2}-121095^{\circ}_{11/2}$
1325.155	4	75462.9	$41026_{17/2}-116489^{\circ}_{17/2}$
1324.595	50*h*	75494.8	
1322.376	1	75621.4	
1321.520	5	75670.4	$39732_{11/2}-115403^{\circ}_{11/2}$
1319.844	1	75766.5	$39732_{11/2}-115499^{\circ}_{9/2}$
1319.796	1	75769.3	$14859_{11/2}-90629^{\circ}_{9/2}$
1316.719	3	75946.4	$39725_{15/2}-115672^{\circ}_{15/2}$
1316.264	1	75972.6	$36670_{11/2}-112643^{\circ}_{11/2}$
1315.596	1	76011.2	$38785_{15/2}-114797^{\circ}_{13/2}$
1314.573	2	76070.3	$14558_{9/2}-90629^{\circ}_{9/2}$
1314.136	20	76095.6	$38701_{13/2}-114797^{\circ}_{13/2}$
1313.582	10	76127.7	$36642_{13/2}-112769^{\circ}_{13/2}$
1313.538	2	76130.3	$35137_{3/2}-111268^{\circ}_{3/2}$
1313.376	5*h*	76139.6	
1312.336	7	76199.0	$39732_{11/2}-115933^{\circ}_{11/2}$
1310.972	1*h*	76279.3	$37011_{5/2}-113291^{\circ}_{7/2}$
1310.898	2*h*	76283.6	
1310.307	2	76318.0	$35024_{7/2}-111342^{\circ}_{7/2}$
1310.001	1	76335.8	
1309.831	2*h*	76345.7	
1308.577	2	76418.9	$16135_{7/2}-92554^{\circ}_{5/2}$
1308.234	2	76438.9	$39870_{9/2}-116309^{\circ}_{11/2}$
1307.215	20*h*	76498.5	
1306.420	1	76545.1	$37011_{5/2}-113556^{\circ}_{5/2}$
1305.892	1	76576.0	$39732_{11/2}-116309^{\circ}_{11/2}$
1305.771	1	76583.1	$39870_{9/2}-116453^{\circ}_{9/2}$
1305.623	1	76591.8	
1303.501	2	76716.5	$37197_{3/2}-113914^{\circ}_{5/2}$
1302.961	3	76748.3	$34520_{5/2}-111268^{\circ}_{3/2}$
1302.884	3*h*	76752.8	
1302.696	10	76763.9	$39725_{15/2}-116489^{\circ}_{17/2}$
1300.617	50	76886.6	$38785_{15/2}-115672^{\circ}_{15/2}$
1300.285	3	76906.2	$18241_{11/2}-95147^{\circ}_{9/2}$
1299.811	30*h*	76934.3	
1299.407	10	76958.2	$36642_{13/2}-113600^{\circ}_{13/2}$
1299.193	2	76970.9	$38701_{13/2}-115672^{\circ}_{15/2}$
1298.693	40	77000.5	
1298.630	100	77004.2	
1298.410	2	77017.3	
1298.139	10*h*	77033.4	
1297.828	3	77051.8	$38448_{9/2}-115499^{\circ}_{9/2}$
1295.473	30	77191.9	$36642_{13/2}-113833^{\circ}_{15/2}$
1294.860	2	77228.4	
1294.456	2	77252.5	
1294.103	3	77273.6	$36640_{7/2}-113914^{\circ}_{5/2}$
1294.043	10	77277.2	$13352_{11/2}-90629^{\circ}_{9/2}$
1293.079	5	77334.8	$40205_{3/2}-117540^{\circ}_{3/2}$
1292.456	3*h*	77372.1	
1292.062	1	77395.7	$15045_{5/2}-92441^{\circ}_{7/2}$
1291.104	20	77453.1	$38785_{15/2}-116238^{\circ}_{15/2}$
			$39870_{9/2}-117323^{\circ}_{11/2}$
1289.817	1	77530.4	
1288.999	2	77579.6	$37919_{7/2}-115499^{\circ}_{9/2}$
1287.736	2*h*	77655.7	
1286.935	300	77704.0	$38785_{15/2}-116489^{\circ}_{17/2}$
1286.530	40*h*	77728.5	
1286.233	1	77746.4	
1284.023	10	77880.2	$37919_{7/2}-115800^{\circ}_{5/2}$
1278.394	3*h*	78223.1	
1277.726	2	78264.0	
1277.553	50*h*	78274.6	
1277.286	30	78291.0	
1276.937	1	78312.4	
1276.817	2*h*	78319.8	
1276.612	2*h*	78332.3	
1276.327	1	78349.8	$38694_{5/2}-117044^{\circ}_{7/2}$
1275.701	1	78388.3	
1274.924	20	78436.0	
1273.361	5	78532.3	$35024_{7/2}-113556^{\circ}_{5/2}$
1272.901	20	78560.7	$25244^{\circ}_{15/2}-103805_{13/2}$
1272.820	1	78565.7	$39120_{3/2}-117686^{\circ}_{5/2}$
1272.690	3	78573.7	$23091^{\circ}_{3/2}-101665_{5/2}$
1271.934	10*h*	78620.4	
1271.829	1	78626.9	
1269.499	1	78771.2	$34520_{5/2}-113291^{\circ}_{7/2}$
1269.345	1	78780.8	$36640_{7/2}-115420^{\circ}_{7/2}$
1269.232	2	78787.8	$37011_{5/2}-115800^{\circ}_{5/2}$
1268.819	2	78813.4	
1268.084	1	78859.1	$36640_{7/2}-115499^{\circ}_{9/2}$
1267.783	40	78877.8	$39732_{11/2}-118610^{\circ}_{13/2}$
1267.235	2*h*	78912.0	
1266.730	2*h*	78943.4	
1265.676	20	79009.2	$39870_{9/2}-118879^{\circ}_{11/2}$
1265.347	5	79029.7	$36640_{7/2}-115670^{\circ}_{7/2}$
			$36642_{13/2}-115672^{\circ}_{15/2}$
1264.221	10	79100.1	
1263.489	20	79145.9	$39732_{11/2}-118879^{\circ}_{11/2}$
1263.274	20	79159.4	$36640_{7/2}-115800^{\circ}_{5/2}$
1263.160	1	79166.5	
1261.871	20	79247.4	$39024_{9/2}-118271^{\circ}_{11/2}$
1260.991	20	79302.7	
1259.747	4	79381.0	$36640_{7/2}-116021^{\circ}_{7/2}$
1258.859	4*h*	79437.0	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1258.754	1	79443.6	
1258.700	2	79447.0	$24357^{\circ}_{11/2}-103805_{13/2}$
1257.936	1	79495.3	$35828_{9/2}-115324^{\circ}_{9/2}$
1257.835	10*h*	79501.7	
1256.362	20	79594.9	$12846_{9/2}-92441^{\circ}_{7/2}$
1255.468	1	79651.6	$38549_{1/2}-118201^{\circ}_{3/2}$
1255.162	3	79671.0	$35828_{9/2}-115499^{\circ}_{9/2}$
1254.915	5	79686.7	
1252.937	7	79812.5	$36640_{7/2}-116453^{\circ}_{9/2}$
			$48401_{3/2}-128214^{\circ}_{3/2}$
1250.337	20	79978.4	
1250.190	10	79987.8	
1249.025	3	80062.4	$23245^{\circ}_{5/2}-103308_{7/2}$
1246.860	5*h*	80201.5	
1245.521	5	80287.7	$14859_{11/2}-95147^{\circ}_{9/2}$
1244.669	2	80342.6	$37197_{3/2}-117540^{\circ}_{3/2}$
1242.667	1	80472.1	
1241.027	5*h*	80578.4	
1239.467	7	80679.8	$24886^{\circ}_{7/2}-105566_{9/2}$
1238.007	4	80775.0	$35024_{7/2}-115800^{\circ}_{5/2}$
1237.976	2	80777.0	
1236.596	1	80867.2	
1235.607	20*h*	80931.9	
1235.369	1	80947.5	
1234.649	1	80994.7	$36652_{5/2}-117647^{\circ}_{7/2}$
1234.534	3	81002.2	
1234.351	1	81014.2	
1234.150	3	81027.4	
1233.869	3	81045.9	$29835_{9/2}-110881^{\circ}_{11/2}$
			$36640_{7/2}-117686^{\circ}_{5/2}$
1233.573	1	81065.3	$29267_{5/2}-110333^{\circ}_{7/2}$
1233.242	1	81087.1	$29835_{9/2}-110922^{\circ}_{9/2}$
1231.958	1	81171.6	
1229.989	3*h*	81301.5	
1229.728	20	81318.8	
1228.610	10 *c l*	81392.8	$39725_{15/2}-121119^{\circ}_{15/2}$
1228.067	2	81428.8	$35024_{7/2}-116453^{\circ}_{9/2}$
1224.015	5	81698.3	$39732_{11/2}-121431^{\circ}_{13/2}$
1223.251	1	81749.4	
1223.055	1	81762.5	
1222.497	10	81799.8	$39732_{11/2}-121532^{\circ}_{11/2}$
1222.214	2	81818.7	$35828_{9/2}-117647^{\circ}_{7/2}$
1222.173	1	81821.5	
1220.398	1	81940.5	$36670_{11/2}-118610^{\circ}_{13/2}$
1220.279	4	81948.5	
1219.975	2	81968.9	$36642_{13/2}-118610^{\circ}_{13/2}$
1219.500	1	82000.8	$29267_{5/2}-111268^{\circ}_{3/2}$
1219.208	20	82020.5	$35024_{7/2}-117044^{\circ}_{7/2}$
1218.533	2	82065.9	
1218.403	4	82074.6	$29267_{5/2}-111342^{\circ}_{7/2}$
1217.644	40	82125.8	
1217.473	3	82137.3	$30505_{11/2}-112643^{\circ}_{11/2}$
1217.169	4	82157.9	$29835_{9/2}-111993^{\circ}_{9/2}$
1217.063	1	82165.0	
1215.996	2	82237.1	$36642_{13/2}-118879^{\circ}_{11/2}$
1214.562	1	82334.2	
1212.271	1	82489.8	$35828_{9/2}-118318^{\circ}_{7/2}$
1212.053	2	82504.6	
1211.998	1	82508.4	$39024_{9/2}-121532^{\circ}_{11/2}$
1211.894	60	82515.5	
1211.111	3	82568.8	
1210.532	3	82608.3	
1210.158	4	82633.8	
1210.078	20	82639.3	
1209.191	2	82699.9	
1208.938	2*h*	82717.2	
1208.755	2	82729.8	$27604_{9/2}-110333^{\circ}_{7/2}$
			$38701_{13/2}-121431^{\circ}_{13/2}$
1208.272	2	82762.8	$45805_{9/2}-128568^{\circ}_{9/2}$
1208.013	40 *b l*	82780.6	
1205.675	2*h*	82941.1	
1205.511	20*h*	82952.4	
1204.999	20 *b l*	82987.6	
1204.511	4*h*	83021.2	
1204.078	50	83051.1	$35828_{9/2}-118879^{\circ}_{11/2}$
1204.000	4	83056.5	$35024_{7/2}-118081^{\circ}_{9/2}$
1203.946	2*h*	83060.2	
1203.448	2	83094.6	$30505_{11/2}-113600^{\circ}_{13/2}$
1203.266	1	83107.1	
1203.106	10*h*	83118.2	
1203.054	2*h*	83121.8	
1202.997	1	83125.7	
1202.889	1	83133.2	
1202.515	2	83159.0	
1202.463	5 *b l*	83162.6	
1202.389	4	83167.8	$25391^{\circ}_{13/2}-108559_{11/2}$
1201.999	1	83194.8	$27138_{7/2}-110333^{\circ}_{7/2}$
1200.879	1	83272.3	$28720_{9/2}-111993^{\circ}_{9/2}$
1200.565	3	83294.1	$35024_{7/2}-118318^{\circ}_{7/2}$
1200.254	5	83315.7	
1200.203	5 *b l*	83319.2	
1200.140	8	83323.6	$29835_{9/2}-113158^{\circ}_{9/2}$
1200.067	5*h*	83328.7	
1198.482	2*h*	83438.9	
1198.399	40	83444.7	$35024_{7/2}-118468^{\circ}_{9/2}$
1197.869	3	83481.6	
1197.651	2	83496.8	
1197.589	50	83501.1	$27380_{11/2}-110881^{\circ}_{11/2}$
1197.505	30	83507.0	$29263_{13/2}-112769^{\circ}_{13/2}$
1196.999	1	83542.3	$27380_{11/2}-110922^{\circ}_{9/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1196.893	10	83549.7	$44903_{5/2}-128453^{\circ}_{7/2}$	1161.532	7	86093.2	$24788_{9/2}-110881^{\circ}_{11/2}$
1196.513	1	83576.2		1161.460	8	86098.5	$29835_{9/2}-115933^{\circ}_{11/2}$
1195.692	4	83633.6	$29263_{13/2}-112896^{\circ}_{15/2}$	1160.892	2	86140.7	$29263_{13/2}-115403^{\circ}_{11/2}$
1194.310	20	83730.4	$27380_{11/2}-111110^{\circ}_{13/2}$	1160.821	3	86145.9	$29263_{13/2}-115408^{\circ}_{13/2}$
1192.794	3	83836.8		1160.717	10	86153.6	$27138_{7/2}-113291^{\circ}_{7/2}$
1192.472	1	83859.4		1160.409	4	86176.5	$27604_{9/2}-113780^{\circ}_{9/2}$
1192.047	15	83889.3	$44679_{7/2}-128568^{\circ}_{9/2}$	1159.818	20	86220.4	$27380_{11/2}-113600^{\circ}_{13/2}$
1191.806	100	83906.3		1159.497	10	86244.3	
1190.132	10	84024.3	$29267_{5/2}-113291^{\circ}_{7/2}$	1158.871	1	86290.9	
1190.043	100	84030.6		1158.222	5*h*	86339.2	
1189.183	20	84091.3		1157.964	2	86358.5	$35024_{7/2}-121382^{\circ}_{9/2}$
1188.622	3	84131.0		1157.912	40	86362.3	
1187.589	15	84204.2	$27138_{7/2}-111342^{\circ}_{7/2}$	1157.279	20	86409.6	$29263_{13/2}-115672^{\circ}_{15/2}$
1187.470	4	84212.6		1156.410	15	86474.5	$29835_{9/2}-116309^{\circ}_{11/2}$
1187.418	1	84216.3		1155.871	3	86514.8	
1187.176	2	84233.5		1155.747	40	86524.1	
1185.662	1	84341.1		1155.635	2	86532.5	$29267_{5/2}-115800^{\circ}_{5/2}$
1185.135	2	84378.6		1154.705	1	86602.2	
1184.806	1	84402.0		1154.526	1	86615.6	
1183.796	1	84474.0		1154.091	1	86648.3	
1183.751	1	84477.2	$36642_{13/2}-121119^{\circ}_{15/2}$	1153.796	5	86670.4	$29263_{13/2}-115933^{\circ}_{11/2}$
1183.029	1	84528.8		1152.347	10	86779.4	$28720_{9/2}-115499^{\circ}_{9/2}$
1182.794	20	84545.6	$31254_{7/2}-115800^{\circ}_{5/2}$	1151.922	2	86811.4	
1182.655	15	84555.5		1151.863	3	86815.9	
1182.425	6*h*	84572.0		1151.718	5	86826.8	$31254_{7/2}-118081^{\circ}_{9/2}$
1182.002	3*h*	84602.2		1151.530	10	86841.0	
1181.852	2	84612.	$27380_{11/2}-111993^{\circ}_{9/2}$	1151.474	10	86845.2	$26446_{7/2}-113291^{\circ}_{7/2}$
1181.804	1	84616.4		1150.956	2	86884.3	$14187^{\circ}_{5/2}-101071_{5/2}$
1180.016	80	84744.6		1150.518	20	86917.4	$25979_{15/2}-112896^{\circ}_{15/2}$
1179.786	4	84761.1		1149.956	30	86959.8	$24309_{3/2}-111268^{\circ}_{3/2}$
1179.739	4	84764.5		1149.740	20	86976.2	$29263_{13/2}-116238^{\circ}_{15/2}$
1178.552	3	84849.9		1149.180	5	87018.6	$24250_{3/2}-111268^{\circ}_{3/2}$
1178.140	40	84879.6		1148.979	10	87033.8	$24461_{5/2}-111494^{\circ}_{5/2}$
1178.012	5	84888.8	$28936_{3/2}-113825^{\circ}_{3/2}$	1148.836	100	87044.6	
1177.911	5 *c l*	84896.1	$26446_{7/2}-111342^{\circ}_{7/2}$	1148.493	20*h*	87070.6	
1177.886	20 *c l*	84897.9	$30505_{11/2}-115403^{\circ}_{11/2}$	1148.136	5	87097.7	
1176.548	5	84994.4	$30505_{11/2}-115499^{\circ}_{9/2}$	1146.717	1	87205.5	$24788_{9/2}-111993^{\circ}_{9/2}$
1175.638	10	85060.2	$28720_{9/2}-113780^{\circ}_{9/2}$	1146.659	1	87209.9	$29835_{9/2}-117044^{\circ}_{7/2}$
1175.458	1	85073.2		1146.600	1	87214.4	$31254_{7/2}-118468^{\circ}_{9/2}$
1175.410	1	85076.7		1146.346	4	87233.7	$23647_{13/2}-110881^{\circ}_{11/2}$
1175.191	10	85092.6		1146.060	1	87255.5	$16089^{\circ}_{13/2}-103344_{11/2}$
1172.829	30	85263.9		1145.869	4	87270.0	$30505_{11/2}-117775^{\circ}_{13/2}$
1171.087	4	85390.8		1145.456	10	87301.5	$28720_{9/2}-116021^{\circ}_{7/2}$
1170.564	10	85428.9		1145.216	1	87319.8	
1169.104	10	85535.6		1144.726	10	87357.2	$25934_{5/2}-113291^{\circ}_{7/2}$
1166.804	10	85704.2	$35828_{9/2}-121532^{\circ}_{11/2}$	1144.009	1	87411.9	
1165.446	3	85804.1	$30505_{11/2}-116309^{\circ}_{11/2}$	1143.937	4	87417.4	$27380_{11/2}-114797^{\circ}_{13/2}$
1164.659	1	85862.0	$24470_{7/2}-110333^{\circ}_{7/2}$	1143.836	2	87425.1	
1163.805	4	85925.0		1143.342	50	87462.9	$23647_{13/2}-111110^{\circ}_{13/2}$
1163.324	3 *b l*	85960.6		1143.244	1	87470.4	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1143.020	2	87487.5	$29835_{9/2}-117323^\circ_{11/2}$	1130.153	3	88483.6	
1142.900	20	87496.7		1129.886	3	88504.5	$25409_{7/2}-113914^\circ_{5/2}$
1142.788	10	87505.3	$26095_{11/2}-113600^\circ_{13/2}$	1129.785	10	88512.4	$29263_{13/2}-117775^\circ_{13/2}$
1142.690	20	87512.8		1129.054	1	88569.7	$27452_{5/2}-116021^\circ_{7/2}$
1142.012	20	87564.8		1128.731	1	88595.1	$22747_{9/2}-111342^\circ_{7/2}$
1141.868	2	87575.8	$30505_{11/2}-118081^\circ_{9/2}$	1127.367	40	88702.3	$26095_{11/2}-114797^\circ_{13/2}$
1141.795	20	87581.4		1127.107	4	88722.7	$21611_{5/2}-110333^\circ_{7/2}$
1141.697	40	87588.9	$28720_{9/2}-116309^\circ_{11/2}$	1127.030	2	88728.8	$39485_{1/2}-128214^\circ_{3/2}$
1141.465	4	87606.7		1126.802	5	88746.7	$25033_{9/2}-113780^\circ_{9/2}$
1141.419	1	87610.2		1126.623	2	88760.8	
1141.262	3	87622.3	$25934_{5/2}-113556^\circ_{5/2}$	1126.282	3	88787.7	
1141.157	2	87630.4		1126.128	300*h*	88799.8	$29263_{13/2}-118063^\circ_{15/2}$
1140.413	200	87687.5	$23647_{13/2}-111335^\circ_{15/2}$	1125.935	4	88815.1	$22527_{7/2}-111342^\circ_{7/2}$
1140.174	30	87705.9	$23175_{13/2}-110881^\circ_{11/2}$	1125.895	5	88818.2	$25979_{15/2}-114797^\circ_{13/2}$
1139.821	10	87733.1	$28720_{9/2}-116453^\circ_{9/2}$	1125.725	20	88831.6	
1139.688	10	87743.3		1125.596	20	88841.8	$22080_{7/2}-110922^\circ_{9/2}$
1139.245	1	87777.4	$29267_{5/2}-117044^\circ_{7/2}$	1125.442	5	88854.0	$28720_{9/2}-117574^\circ_{11/2}$
1139.090	3	87789.4		1125.355	1	88860.8	
1138.958	3	87799.6	$27604_{9/2}-115403^\circ_{11/2}$	1124.668	30	88915.1	$21418_{5/2}-110333^\circ_{7/2}$
1138.822	2	87810.0	$23532_{5/2}-111342^\circ_{7/2}$	1124.366	1	88939.0	
1138.712	80	87818.5		1124.014	1	88966.9	$22527_{7/2}-111494^\circ_{5/2}$
1138.231	2	87855.6	$24788_{9/2}-112643^\circ_{11/2}$	1123.920	15	88974.3	$26446_{7/2}-115420^\circ_{7/2}$
1137.886	30	87882.3	$25409_{7/2}-113291^\circ_{7/2}$	1123.708	1	88991.1	$22277_{3/2}-111268^\circ_{3/2}$
1137.809	50	87888.2		1123.647	3	88995.9	
1137.714	100	87895.6	$27604_{9/2}-115499^\circ_{9/2}$	1123.103	2	89039.0	$21294_{7/2}-110333^\circ_{7/2}$
1137.197	20	87935.5	$23175_{13/2}-111110^\circ_{13/2}$	1123.041	1	89043.9	$29835_{9/2}-118879^\circ_{11/2}$
1136.852	3	87962.2	$23532_{5/2}-111494^\circ_{5/2}$	1122.803	3	89062.8	
1136.709	50	87973.3		1122.386	7	89095.9	$24461_{5/2}-113556^\circ_{5/2}$
1136.628	8	87979.5	$25934_{5/2}-113914^\circ_{5/2}$	1122.005	40	89126.2	
1136.551	1	87985.5	$29263_{13/2}-117248^\circ_{13/2}$	1121.452	3	89170.1	
1136.484	4	87990.7	$17642^\circ_{15/2}-105632_{13/2}$	1121.115	5	89196.9	
1135.927	20	88033.8		1120.707	3	89229.4	$26095_{11/2}-115324^\circ_{9/2}$
1135.835	1	88041.0	$17409^\circ_{11/2}-105450_{11/2}$	1120.577	2	89239.7	
1135.654	1	88055.0		1120.463	1	89248.8	$23647_{13/2}-112896^\circ_{15/2}$
1135.268	10	88084.9		1120.300	4	89261.8	$22080_{7/2}-111342^\circ_{7/2}$
1135.004	300	88105.4	$30505_{11/2}-118610^\circ_{13/2}$	1120.257	1	89265.2	$28936_{3/2}-118201^\circ_{3/2}$
1134.751	8	88125.1	$25033_{9/2}-113158^\circ_{9/2}$	1119.698	2	89309.8	$24470_{7/2}-113780^\circ_{9/2}$
1134.462	4	88147.5	$25409_{7/2}-113556^\circ_{5/2}$	1119.636	30	89314.7	$23844_{9/2}-113158^\circ_{9/2}$
1134.298	50	88160.2	$23175_{13/2}-111335^\circ_{15/2}$				$27138_{7/2}-116453^\circ_{9/2}$
1133.483	30	88223.6		1119.555	1	89321.2	
1133.272	20	88240.1		1119.470	10	89328.0	$23442_{11/2}-112769^\circ_{13/2}$
1132.851	40	88272.9	$29267_{5/2}-117540^\circ_{3/2}$	1119.241	40	89346.3	$21535_{9/2}-110881^\circ_{11/2}$
1131.973	1	88341.3	$23651_{7/2}-111993^\circ_{9/2}$	1119.153	40	89353.3	$26446_{7/2}-115800^\circ_{5/2}$
1131.719	2	88361.2	$27138_{7/2}-115499^\circ_{9/2}$	1119.054	100*h*	89361.2	
1131.558	10	88373.7	$30505_{11/2}-118879^\circ_{11/2}$	1118.723	4	89387.6	$21535_{9/2}-110922^\circ_{9/2}$
1131.283	8	88395.2	$22527_{7/2}-110922^\circ_{9/2}$	1118.508	30	89404.8	$26095_{11/2}-115499^\circ_{9/2}$
1130.988	15	88418.3	$29267_{5/2}-117686^\circ_{5/2}$	1118.395	15	89413.8	$22080_{7/2}-111494^\circ_{5/2}$
1130.753	2	88436.6	$29835_{9/2}-118271^\circ_{11/2}$	1118.027	8	89443.3	$24470_{7/2}-113914^\circ_{5/2}$
1130.654	1	88444.4	$23050_{3/2}-111494^\circ_{5/2}$	1117.977	20	89447.3	$23844_{9/2}-113291^\circ_{7/2}$
1130.363	3	88467.2		1117.904	5	89453.1	$24461_{5/2}-113914^\circ_{5/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1117.803	10	89461.2	
1117.500	6	89485.5	$20848_{5/2}-110333^{\circ}_{7/2}$
			$25934_{5/2}-115420^{\circ}_{7/2}$
1117.230	3	89507.1	$23651_{7/2}-113158^{\circ}_{9/2}$
1116.681	30	89551.1	$28720_{9/2}-118271^{\circ}_{11/2}$
1116.516	3	89564.3	
1116.382	30	89575.1	$24250_{3/2}-113825^{\circ}_{3/2}$
			$26446_{7/2}-116021^{\circ}_{7/2}$
1116.264	3	89584.5	
1116.139	50	89594.6	$23175_{13/2}-112769^{\circ}_{13/2}$
1115.725	15	89627.8	$21294_{7/2}-110922^{\circ}_{9/2}$
1115.571	30	89640.2	$23651_{7/2}-113291^{\circ}_{7/2}$
1115.429	10	89651.6	
1115.353	1	89657.7	$21611_{5/2}-111268^{\circ}_{3/2}$
1114.912	60	89693.2	$25979_{15/2}-115672^{\circ}_{15/2}$
1114.581	30	89719.8	
1114.436	1	89731.5	$21611_{5/2}-111342^{\circ}_{7/2}$
1114.228	20	89748.2	$28720_{9/2}-118468^{\circ}_{9/2}$
1113.753	10	89786.5	$23844_{9/2}-113630^{\circ}_{7/2}$
1113.489	10	89807.8	$21535_{9/2}-111342^{\circ}_{7/2}$
1112.965	10	89850.1	$21418_{5/2}-111268^{\circ}_{3/2}$
1112.582	10	89881.0	
1112.549	5	89883.7	$21611_{5/2}-111494^{\circ}_{5/2}$
1112.400	1	89895.7	$22747_{9/2}-112643^{\circ}_{11/2}$
1112.268	30	89906.4	$27138_{7/2}-117044^{\circ}_{7/2}$
1112.162	10	89915.0	$25409_{7/2}-115324^{\circ}_{9/2}$
1112.050	5	89924.0	$21418_{5/2}-111342^{\circ}_{7/2}$
1111.902	10	89936.0	$23844_{9/2}-113780^{\circ}_{9/2}$
1111.768	40	89946.8	
1111.694	100	89952.8	$23647_{13/2}-113600^{\circ}_{13/2}$
1111.539	20	89965.4	
1111.475	10	89970.5	$27604_{9/2}-117574^{\circ}_{11/2}$
1111.373	3	89978.8	$23651_{7/2}-113630^{\circ}_{7/2}$
1111.174	50	89994.9	$28885_{9/2}-118879^{\circ}_{11/2}$
1111.117	1	89999.5	
1111.035	1	90006.2	$26446_{7/2}-116453^{\circ}_{9/2}$
1110.898	1	90017.3	$20315_{9/2}-110333^{\circ}_{7/2}$
1110.656	1	90036.9	
1110.520	200	90047.9	$21294_{7/2}-111342^{\circ}_{7/2}$
1110.172	30	90076.1	$21418_{5/2}-111494^{\circ}_{5/2}$
1110.082	1	90083.4	
1109.801	5	90106.2	
1109.523	15	90128.8	$23651_{7/2}-113780^{\circ}_{9/2}$
1109.156	200	90158.6	$28720_{9/2}-118879^{\circ}_{11/2}$
1109.011	20	90170.4	
1108.879	10	90181.2	
1108.817	500	90186.2	$23647_{13/2}-113833^{\circ}_{15/2}$
1108.709	20	90195.0	$27452_{5/2}-117647^{\circ}_{7/2}$
1108.648	3	90200.0	$21294_{7/2}-111494^{\circ}_{5/2}$
1108.115	6	90243.3	
1107.998	40	90252.9	
1107.911	80	90260.0	$25979_{15/2}-116238^{\circ}_{15/2}$
			$25409_{7/2}-115670^{\circ}_{7/2}$
1107.881	20 *c l*	90262.4	$23651_{7/2}-113914^{\circ}_{5/2}$
1107.536	100	90290.5	$25033_{9/2}-115324^{\circ}_{9/2}$
1107.096	20	90326.4	
1106.948	2	90338.5	$23442_{11/2}-113780^{\circ}_{9/2}$
1106.755	3	90354.2	
1106.567	80	90369.6	$25033_{9/2}-115403^{\circ}_{11/2}$
1106.423	20	90381.4	$23532_{5/2}-113914^{\circ}_{5/2}$
1106.341	10 *c l*	90388.0	
1106.311	30	90390.5	$25409_{7/2}-115800^{\circ}_{5/2}$
1106.252	3	90395.3	$27380_{11/2}-117775^{\circ}_{13/2}$
1106.060	4	90411.0	$22747_{9/2}-113158^{\circ}_{9/2}$
1105.962	200	90419.0	
1105.754	6	90436.0	
1105.492	2	90457.5	$21535_{9/2}-111993^{\circ}_{9/2}$
1105.386	80	90466.1	$25033_{9/2}-115499^{\circ}_{9/2}$
1105.214	20	90480.2	
1104.843	2000	90510.6	$25979_{15/2}-116489^{\circ}_{17/2}$
1104.721	10	90520.6	
1104.525	40	90536.7	$24788_{9/2}-115324^{\circ}_{9/2}$
1104.389	4	90547.8	$27138_{7/2}-117686^{\circ}_{5/2}$
1104.173	2	90565.5	$20315_{9/2}-110881^{\circ}_{11/2}$
1103.780	20	90597.8	$26446_{7/2}-117044^{\circ}_{7/2}$
1103.660	40	90607.6	
1103.605	10	90612.1	$25409_{7/2}-116021^{\circ}_{7/2}$
1103.553	20*h*	90616.4	
1103.354	5	90632.7	$24788_{9/2}-115420^{\circ}_{7/2}$
1103.185	8	90646.6	$20848_{5/2}-111494^{\circ}_{5/2}$
1103.150	15	90649.5	$37919_{7/2}-128568^{\circ}_{9/2}$
1103.035	400	90659.0	$23175_{13/2}-113833^{\circ}_{15/2}$
1102.938	1	90666.9	$27604_{9/2}-118271^{\circ}_{11/2}$
1102.556	20	90698.3	$21294_{7/2}-111993^{\circ}_{9/2}$
1102.392	200	90711.8	$24788_{9/2}-115499^{\circ}_{9/2}$
1101.939	20	90749.1	$27452_{5/2}-118201^{\circ}_{3/2}$
1101.757	100	90764.1	$22527_{7/2}-113291^{\circ}_{7/2}$
1101.660	1	90772.1	
1101.542	1	90781.8	
1100.673	40	90853.5	$24470_{7/2}-115324^{\circ}_{9/2}$
1100.546	1	90864.0	$23050_{3/2}-113914^{\circ}_{5/2}$
			$27604_{9/2}-118468^{\circ}_{9/2}$
1100.515	2	90866.6	$27452_{5/2}-118318^{\circ}_{7/2}$
1100.389	4	90877.0	$30505_{11/2}-121382^{\circ}_{9/2}$
1099.894	4	90917.8	
1099.803	200	90925.4	$30505_{11/2}-121431^{\circ}_{13/2}$
1099.596	4	90942.5	$27138_{7/2}-118081^{\circ}_{9/2}$
1099.505	20	90950.0	$24470_{7/2}-115420^{\circ}_{7/2}$
1099.389	7	90959.6	$24461_{5/2}-115420^{\circ}_{7/2}$
1099.045	40	90988.1	$25033_{9/2}-116021^{\circ}_{7/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1098.981	3	90993.4	
1098.735	1	91013.8	$21755_{11/2}-112769^{\circ}_{13/2}$
1098.573	40	91027.2	$20315_{9/2}-111342^{\circ}_{7/2}$
			$30505_{11/2}-121532^{\circ}_{11/2}$
1098.506	4	91032.7	$22747_{9/2}-113780^{\circ}_{9/2}$
1098.296	40	91050.1	$19872_{7/2}-110922^{\circ}_{9/2}$
1098.243	20	91054.5	
1098.164	2	91061.1	
1097.967	1	91077.4	$22080_{7/2}-113158^{\circ}_{9/2}$
1097.595	100	91108.3	$20160_{3/2}-111268^{\circ}_{3/2}$
1097.148	50	91145.4	$24788_{9/2}-115933^{\circ}_{11/2}$
1096.955	1	91161.4	
1096.731	20	91180.1	$19700_{11/2}-110881^{\circ}_{11/2}$
			$27138_{7/2}-118318^{\circ}_{7/2}$
1096.367	10*h*	91210.3	$22080_{7/2}-113291^{\circ}_{7/2}$
1096.121	100	91230.8	$27380_{11/2}-118610^{\circ}_{13/2}$
1096.080	50 *b l*	91234.2	$24788_{9/2}-116021^{\circ}_{7/2}$
1095.856	30	91252.9	$22527_{7/2}-113780^{\circ}_{9/2}$
1095.766	100	91260.4	$29835_{9/2}-121095^{\circ}_{11/2}$
1095.587	60	91275.3	$25033_{9/2}-116309^{\circ}_{11/2}$
			$27604_{9/2}-118879^{\circ}_{11/2}$
1095.513	30	91281.4	
1095.403	15	91290.6	
1094.928	80	91330.2	$27138_{7/2}-118468^{\circ}_{9/2}$
1094.878	30	91334.4	$20160_{3/2}-111494^{\circ}_{5/2}$
1094.832	1	91338.2	$24461_{5/2}-115800^{\circ}_{5/2}$
1094.767	15	91343.6	$18990_{7/2}-110333^{\circ}_{7/2}$
1094.637	1	91354.5	$23442_{11/2}-114797^{\circ}_{13/2}$
1094.486	30	91367.1	
1094.255	80	91386.4	$22527_{7/2}-113914^{\circ}_{5/2}$
1094.058	3	91402.8	$21755_{11/2}-113158^{\circ}_{9/2}$
1093.870	10	91418.5	
1093.601	1	91441.0	$37011_{5/2}-128453^{\circ}_{7/2}$
1093.521	80	91447.7	
1093.253	80	91470.1	$19872_{7/2}-111342^{\circ}_{7/2}$
1093.185	60	91475.8	$22080_{7/2}-113556^{\circ}_{5/2}$
1092.910	20	91498.8	$27380_{11/2}-118879^{\circ}_{11/2}$
1092.529	2	91530.8	$21238_{13/2}-112769^{\circ}_{13/2}$
			$36683_{1/2}-128214^{\circ}_{3/2}$
1092.481	6	91534.8	
1092.325	20 *c l*	91547.8	$22277_{3/2}-113825^{\circ}_{3/2}$
			$29835_{9/2}-121382^{\circ}_{9/2}$
1092.301	20 *c l*	91549.9	$22080_{7/2}-113630^{\circ}_{7/2}$
			$24250_{3/2}-115800^{\circ}_{5/2}$
1092.032	2	91572.4	$19308_{11/2}-110881^{\circ}_{11/2}$
1091.983	3	91576.5	$23844_{9/2}-115420^{\circ}_{7/2}$
1091.676	1	91602.3	
1091.555	30	91612.4	
1091.477	70	91619.0	
1091.430	30*h*	91622.9	
1091.293	2	91634.4	$25409_{7/2}-117044^{\circ}_{7/2}$
			$26446_{7/2}-118081^{\circ}_{9/2}$
1091.097	1	91650.9	
1091.047	2	91655.1	$23844_{9/2}-115499^{\circ}_{9/2}$
1090.876	2	91669.4	
1090.839	2	91672.6	$23651_{7/2}-115324^{\circ}_{9/2}$
1090.739	5	91681.0	$21611_{5/2}-113291^{\circ}_{7/2}$
1090.626	50	91690.5	
1090.536	200	91698.0	$29835_{9/2}-121532^{\circ}_{11/2}$
1090.366	10	91712.3	$25934_{5/2}-117647^{\circ}_{7/2}$
			$36640_{7/2}-128352^{\circ}_{9/2}$
1090.006	15	91742.6	
1089.921	1	91749.8	$19360_{13/2}-111110^{\circ}_{13/2}$
1089.844	4	91756.2	$21535_{9/2}-113291^{\circ}_{7/2}$
			$23647_{13/2}-115403^{\circ}_{11/2}$
1089.571	20	91779.2	
1089.464	15	91788.2	
1089.312	8	91801.1	$19308_{11/2}-111110^{\circ}_{13/2}$
			$36652_{5/2}-128453^{\circ}_{7/2}$
1089.167	1	91813.3	$36640_{7/2}-128453^{\circ}_{7/2}$
1088.933	30	91833.0	$22080_{7/2}-113914^{\circ}_{5/2}$
1088.879	3	91837.6	
1088.659	500	91856.1	$29263_{13/2}-121119^{\circ}_{15/2}$
1088.572	20	91863.5	$21294_{7/2}-113158^{\circ}_{9/2}$
1088.353	10	91881.9	$23442_{11/2}-115324^{\circ}_{9/2}$
1088.284	10	91887.8	$23532_{5/2}-115420^{\circ}_{7/2}$
1088.125	70	91901.2	
1087.804	100	91928.3	$36640_{7/2}-128568^{\circ}_{9/2}$
1087.601	4	91945.5	$21611_{5/2}-113556^{\circ}_{5/2}$
1087.563	1	91948.7	
1087.465	2	91957.0	
1087.418	2	91961.0	$23442_{11/2}-115403^{\circ}_{11/2}$
1087.362	1	91965.7	$23442_{11/2}-115408^{\circ}_{13/2}$
1087.252	4	91974.0	$19360_{13/2}-111335^{\circ}_{15/2}$
1087.164	4	91982.4	$24470_{7/2}-116453^{\circ}_{9/2}$
1087.063	1	91991.0	
1086.993	5	91996.9	$21294_{7/2}-113291^{\circ}_{7/2}$
1086.700	40	92021.7	$26446_{7/2}-118468^{\circ}_{9/2}$
1086.598	10	92030.4	
1086.538	1	92035.4	
1086.388	2	92048.1	
1086.321	3	92053.8	$18241_{11/2}-110295^{\circ}_{11/2}$
1086.280	2	92057.3	$23442_{11/2}-115499^{\circ}_{9/2}$
1085.915	40	92088.2	$23844_{9/2}-115933^{\circ}_{11/2}$
1085.828	20	92095.6	$21535_{9/2}-113630^{\circ}_{7/2}$
1085.531	20	92120.8	$19872_{7/2}-111993^{\circ}_{9/2}$
1085.435	1	92129.0	$21535_{9/2}-113664^{\circ}_{11/2}$
1085.380	1	92133.6	
1085.283	2	92141.9	
1085.236	10	92145.8	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification[a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification[a]
1085.112	8	92156.4		1079.013	10	92677.3	$21148_{3/2}-113825^{\circ}_{3/2}$
1084.976	15	92167.9	$29263_{13/2}-121431^{\circ}_{13/2}$	1078.672	1	92706.6	$17627_{9/2}-110333^{\circ}_{7/2}$
1084.873	10	92176.7	$23844_{9/2}-116021^{\circ}_{7/2}$	1078.516	2	92720.0	
			$26095_{11/2}-118271^{\circ}_{11/2}$	1077.972	2	92766.8	
1084.417	500	92215.4	$41026_{17/2}-133242^{\circ}_{19/2}$	1077.851	1	92777.2	
1084.262	8 *b l*	92228.6	$23175_{13/2}-115403^{\circ}_{11/2}$	1077.782	40	92783.1	
1084.204	7	92233.6	$23175_{13/2}-115408^{\circ}_{13/2}$	1077.742	4	92786.6	$24788_{9/2}-117574^{\circ}_{11/2}$
1084.157	20	92237.6	$25409_{7/2}-117647^{\circ}_{7/2}$	1077.623	2	92796.8	$22527_{7/2}-115324^{\circ}_{9/2}$
1084.071	1	92244.9	$21535_{9/2}-113780^{\circ}_{9/2}$	1077.571	30	92801.3	$23651_{7/2}-116453^{\circ}_{9/2}$
1083.936	20	92256.4	$24470_{7/2}-116727^{\circ}_{5/2}$	1077.451	10	92811.6	$28720_{9/2}-121532^{\circ}_{11/2}$
			$24788_{9/2}-117044^{\circ}_{7/2}$	1077.382	20	92817.6	$18063_{9/2}-110881^{\circ}_{11/2}$
1083.876	40	92261.5	$21294_{7/2}-113556^{\circ}_{5/2}$	1076.902	40	92856.0	$18063_{9/2}-110922^{\circ}_{9/2}$
1083.815	10	92266.7	$23532_{5/2}-115800^{\circ}_{5/2}$				$24788_{9/2}-117647^{\circ}_{7/2}$
			$25934_{5/2}-118201^{\circ}_{3/2}$	1076.831	3	92865.1	
1083.747	20	92272.4		1076.790	10	92868.6	$18241_{11/2}-111110^{\circ}_{13/2}$
1083.697	2	92276.7	$25409_{7/2}-117686^{\circ}_{5/2}$	1076.708	2	92875.7	
1083.548	5	92289.4	$18241_{11/2}-110530^{\circ}_{13/2}$	1076.325	30	92908.7	$25409_{7/2}-118318^{\circ}_{7/2}$
			$25033_{9/2}-117323^{\circ}_{11/2}$	1076.137	5	92925.0	
1083.393	10	92302.6	$21611_{5/2}-113914^{\circ}_{5/2}$	1075.961	100	92940.2	
1083.348	20	92306.4		1075.707	2	92962.1	
1083.285	1	92311.8		1075.586	10 *c l*	92972.6	$22527_{7/2}-115499^{\circ}_{9/2}$
1083.001	10	92336.0	$21294_{7/2}-113630^{\circ}_{7/2}$	1075.565	50 *c l*	92974.4	
1082.881	40	92346.2	$41026_{17/2}-133373^{\circ}_{17/2}$	1075.532	10 *c l*	92977.2	$20848_{5/2}-113825^{\circ}_{3/2}$
1082.824	8	92351.1		1075.448	1	92984.5	
1082.704	50	92361.4	$21238_{13/2}-113600^{\circ}_{13/2}$	1075.147	1	93010.5	$23442_{11/2}-116453^{\circ}_{9/2}$
1082.445	8	92383.4	$25934_{5/2}-118318^{\circ}_{7/2}$	1074.855	100	93035.8	
1082.091	20	92413.7	$18921_{15/2}-111335^{\circ}_{15/2}$	1074.726	5	93047.0	$25033_{9/2}-118081^{\circ}_{9/2}$
1082.045	10	92417.6	$24309_{3/2}-116727^{\circ}_{5/2}$	1074.669	40	93051.9	
1081.807	3	92437.9		1074.590	7	93058.8	$25409_{7/2}-118468^{\circ}_{9/2}$
1081.746	10	92443.1	$20848_{5/2}-113291^{\circ}_{7/2}$	1074.515	100	93065.2	$20848_{5/2}-113914^{\circ}_{5/2}$
1081.574	3	92457.8		1074.474	5	93068.8	$19700_{11/2}-112769^{\circ}_{13/2}$
1081.356	20	92476.5	$24250_{3/2}-116727^{\circ}_{5/2}$	1074.353	7	93079.3	$24461_{5/2}-117540^{\circ}_{3/2}$
1081.252	5	92485.4	$21294_{7/2}-113780^{\circ}_{9/2}$	1074.171	5	93095.0	
1081.210	5	92489.0	$23532_{5/2}-116021^{\circ}_{7/2}$	1074.041	5	93106.3	
1080.898	100	92515.7	$26095_{11/2}-118610^{\circ}_{13/2}$	1073.901	200	93118.4	$27380_{11/2}-120498^{\circ}_{13/2}$
1080.797	6	92524.3	$35828_{9/2}-128352^{\circ}_{9/2}$	1073.801	1	93127.1	
1080.553	2	92545.2		1073.661	100	93139.3	
1080.459	300	92553.3	$35828_{9/2}-128381^{\circ}_{11/2}$	1073.340	20	93167.1	
1080.187	50	92576.6	$22747_{9/2}-115324^{\circ}_{9/2}$	1073.308	3	93169.9	
1080.110	20	92583.2	$24461_{5/2}-117044^{\circ}_{7/2}$	1073.126	200	93185.7	$22747_{9/2}-115933^{\circ}_{11/2}$
1080.019	2	92591.0		1072.600	30	93231.4	$24309_{3/2}-117540^{\circ}_{3/2}$
1079.947	3	92597.1		1072.529	100	93237.6	$25033_{9/2}-118271^{\circ}_{11/2}$
1079.921	10	92599.4		1072.466	20	93243.0	$22080_{7/2}-115324^{\circ}_{9/2}$
1079.727	10	92616.0		1072.425	5	93246.6	$19649_{17/2}-112896^{\circ}_{15/2}$
1079.698	10	92618.5		1072.342	20	93253.8	$17627_{9/2}-110881^{\circ}_{11/2}$
1079.452	100	92639.6	$18241_{11/2}-110881^{\circ}_{11/2}$	1072.237	8	93263.0	
1079.268	60	92655.4	$22747_{9/2}-115403^{\circ}_{11/2}$	1072.108	50 *c l*	93274.2	$22747_{9/2}-116021^{\circ}_{7/2}$
1079.204	1	92660.9	$23647_{13/2}-116309^{\circ}_{11/2}$	1072.076	10 *c l*	93277.0	$35291_{9/2}-128568^{\circ}_{9/2}$
1079.078	50 *c l*	92671.7	$25409_{7/2}-118081^{\circ}_{9/2}$	1072.009	100	93282.8	
1079.058	50 *c l*	92673.4	$22747_{9/2}-115420^{\circ}_{7/2}$	1071.968	10	93286.4	$19872_{7/2}-113158^{\circ}_{9/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1071.865	200	93295.3	$17627_{9/2}-110922^{\circ}_{9/2}$	1065.331	40	93867.5	$21535_{9/2}-115403^{\circ}_{11/2}$
1071.487	100	93328.2	$35024_{7/2}-128352^{\circ}_{9/2}$	1065.224	2	93877.0	
1071.422	300	93333.9	$19308_{11/2}-112643^{\circ}_{11/2}$	1065.128	20	93885.4	$21535_{9/2}-115420^{\circ}_{7/2}$
1071.334	50	93341.6		1064.971	40	93899.3	$19700_{11/2}-113600^{\circ}_{13/2}$
1071.213	100	93352.1		1064.874	10	93907.8	$19872_{7/2}-113780^{\circ}_{9/2}$
1070.750	3	93392.5	$23651_{7/2}-117044^{\circ}_{7/2}$	1064.795	50	93914.8	
1070.617	7	93404.1		1064.640	20 *c l*	93928.5	$27604_{9/2}-121532^{\circ}_{11/2}$
1070.554	80	93409.6	$19360_{13/2}-112769^{\circ}_{13/2}$	1064.585	100	93933.3	$34520_{5/2}-128453^{\circ}_{7/2}$
1070.461	60	93417.7	$17113_{13/2}-110530^{\circ}_{13/2}$	1064.499	40	93940.9	$22080_{7/2}-116021^{\circ}_{7/2}$
1070.336	10	93428.6	$35024_{7/2}-28453^{\circ}_{7/2}$	1064.390	100	93950.5	$24250_{3/2}-118201^{\circ}_{3/2}$
1070.246	100	93436.5		1064.289	50	93959.4	
1069.881	500	93468.3	$39725_{15/2}-133194^{\circ}_{17/2}$	1064.127	10 *c l*	93973.7	
1069.768	20	93478.2	$23844_{9/2}-117323^{\circ}_{11/2}$	1064.102	5 *c l*	93976.0	
1069.710	40	93483.3	$24788_{9/2}-118271^{\circ}_{11/2}$	1063.926	20	93991.5	
1069.622	100	93491.0	$27604_{9/2}-121095^{\circ}_{11/2}$	1063.858	60	93997.5	$17113_{13/2}-111110^{\circ}_{13/2}$
1069.520	1	93499.9					$24470_{7/2}-118468^{\circ}_{9/2}$
1069.385	60	93511.7	$23532_{5/2}-117044^{\circ}_{7/2}$	1063.746	10	94007.4	$23532_{5/2}-117540^{\circ}_{3/2}$
1069.265	5	93522.2	$22277_{3/2}-115800^{\circ}_{5/2}$	1063.653	20	94015.6	$34198_{1/2}-128214^{\circ}_{3/2}$
1069.108	20	93535.9	$19360_{13/2}-112896^{\circ}_{15/2}$	1063.362	20	94041.4	$19872_{7/2}-113914^{\circ}_{5/2}$
1068.852	500 *c l*	93558.3	$21238_{13/2}-114797^{\circ}_{13/2}$	1063.255	100	94050.8	$27380_{11/2}-121431^{\circ}_{13/2}$
1068.820	5 *c l*	93561.1	$22747_{9/2}-116309^{\circ}_{11/2}$	1063.163	70	94059.0	$21611_{5/2}-115670^{\circ}_{7/2}$
1068.761	10*h*	93566.3		1063.104	50	94064.2	
1068.641	80	93576.8		1062.911	10	94081.2	
1068.397	200	93598.2		1062.819	5	94089.4	
1068.270	2	93609.3		1062.673	100	94102.3	$18921_{15/2}-113023^{\circ}_{17/2}$
1068.014	10	93631.7		1062.392	50 *c l*	94127.2	$23647_{13/2}-117775^{\circ}_{13/2}$
1067.950	300	93637.3		1062.356	50 *c l*	94130.4	
1067.910	5 *c l*	93640.8		1062.095	80	94153.5	$23532_{5/2}-117686^{\circ}_{5/2}$
1067.848	10*h*	93646.3		1061.975	40	94164.2	$21238_{13/2}-115403^{\circ}_{11/2}$
1067.779	20	93652.3	$21755_{11/2}-115408^{\circ}_{13/2}$	1061.909	20 *c l*	94170.0	$21238_{13/2}-115408^{\circ}_{13/2}$
1067.503	50	93676.6	$23050_{3/2}-116727^{\circ}_{5/2}$	1061.887	10 *c l*	94172.0	
1067.416	40	93684.2	$19872_{7/2}-113556^{\circ}_{5/2}$	1061.830	4	94177.0	$21755_{11/2}-115933^{\circ}_{11/2}$
1067.167	10	93706.0	$22747_{9/2}-116453^{\circ}_{9/2}$	1061.695	10	94189.0	$21611_{5/2}-115800^{\circ}_{5/2}$
1067.117	200	93710.4		1061.599	500	94197.5	$16135_{7/2}-110333^{\circ}_{7/2}$
1067.068	20	93714.7	$27380_{11/2}-121095^{\circ}_{11/2}$	1061.519	5	94204.6	$21294_{7/2}-115499^{\circ}_{9/2}$
1067.000	10	93720.7		1061.328	200	94221.6	$17113_{13/2}-111335^{\circ}_{15/2}$
1066.896	200	93729.8	$23844_{9/2}-117574^{\circ}_{11/2}$	1061.162	30 *c l*	94236.3	$23844_{9/2}-118081^{\circ}_{9/2}$
1066.570	20	93758.5	$19872_{7/2}-113630^{\circ}_{7/2}$	1061.120	30 *c l*	94240.0	$19360_{13/2}-113600^{\circ}_{13/2}$
1066.520	2	93762.9		1061.072	5 *c l*	94244.3	$27138_{7/2}-121382^{\circ}_{9/2}$
1066.465	3	93767.7	$17113_{13/2}-110881^{\circ}_{11/2}$	1061.051	5 *c l*	94246.2	
1066.345	100	93778.3	$27604_{9/2}-121382^{\circ}_{9/2}$	1060.993	100	94251.3	$21418_{5/2}-115670^{\circ}_{7/2}$
1066.223	20	93789.0	$21535_{9/2}-115324^{\circ}_{9/2}$	1060.857	100	94263.4	
1066.177	3	93793.0		1060.734	20	94274.3	
1066.089	20 *c l*	93800.8	$17534_{15/2}-111335^{\circ}_{15/2}$	1060.546	200	94291.0	$19308_{11/2}-113600^{\circ}_{13/2}$
1066.034	500	93805.6	$23442_{11/2}-117248^{\circ}_{13/2}$	1060.486	10	94296.4	$22747_{9/2}-117044^{\circ}_{7/2}$
1065.791	30	93827.0		1060.250	30	94317.4	
1065.625	10	93841.6		1060.160	40	94325.4	
1065.586	10	93845.1	$25033_{9/2}-118879^{\circ}_{11/2}$	1060.077	20	94332.8	$23442_{11/2}-117775^{\circ}_{13/2}$
1065.524	80	93850.5		1059.926	10	94346.2	
1065.464	20	93855.8		1059.822	20	94355.5	$19308_{11/2}-113664^{\circ}_{11/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1059.714	10	94365.1	
1059.631	100 *c l*	94372.5	$22080_{7/2}-116453^{\circ}_{9/2}$
1059.587	100 *c l*	94376.4	
1059.410	50	94392.2	
1059.281	400 *c l*	94403.7	$26095_{11/2}-120498^{\circ}_{13/2}$
1059.250	100 *c l*	94406.4	$16516_{7/2}-110922^{\circ}_{9/2}$
1059.157	200	94414.7	
1059.022	60	94426.8	$23844_{9/2}-118271^{\circ}_{11/2}$
1058.948	10	94433.3	$21238_{13/2}-115672^{\circ}_{15/2}$
1058.769	60	94449.3	$22277_{3/2}-116727^{\circ}_{5/2}$
1058.510	100	94472.4	
1058.393	3	94482.9	
1058.348	3	94486.9	$21535_{9/2}-116021^{\circ}_{7/2}$
1058.150	4	94504.6	$21294_{7/2}-115800^{\circ}_{5/2}$
1058.018	20	94516.4	$22527_{7/2}-117044^{\circ}_{7/2}$
1057.903	5 *c l*	94526.6	
1057.885	10 *c l*	94528.2	$18241_{11/2}-112769^{\circ}_{13/2}$
1057.783	100	94537.3	
1057.721	100	94542.9	
1057.490	10 *c l*	94563.5	
1057.456	20	94566.6	$18990_{7/2}-113556^{\circ}_{5/2}$
			$38785_{15/2}-133352^{\circ}_{15/2}$
1057.310	400	94579.6	$18063_{9/2}-112643^{\circ}_{11/2}$
1057.228	200	94587.0	$38785_{15/2}-133373^{\circ}_{17/2}$
1057.080	40	94600.2	$23175_{13/2}-117775^{\circ}_{13/2}$
1056.815	10	94623.9	$23647_{13/2}-118271^{\circ}_{11/2}$
			$23844_{9/2}-118468^{\circ}_{9/2}$
1056.619	8	94641.5	
1056.518	100	94650.5	$38701_{13/2}-133352^{\circ}_{15/2}$
1056.314	20	94668.8	$23532_{5/2}-118201^{\circ}_{3/2}$
1056.211	50	94678.0	
1056.030	80	94694.3	$21238_{13/2}-115933^{\circ}_{11/2}$
1055.857	20	94709.8	
1055.668	20	94726.8	$21294_{7/2}-116021^{\circ}_{7/2}$
1055.297	20	94760.0	
1055.143	300	94773.9	$21535_{9/2}-116309^{\circ}_{11/2}$
1055.072	30	94780.3	
1054.613	50	94821.5	$20848_{5/2}-115670^{\circ}_{7/2}$
1054.558	50 *c l*	94826.5	$16516_{7/2}-111342^{\circ}_{7/2}$
1054.525	80 *c l*	94829.4	$23442_{11/2}-118271^{\circ}_{11/2}$
1054.441	60	94837.0	
1054.388	5	94841.7	
1054.263	7	94853.0	
1053.876	400	94887.8	$23175_{13/2}-118063^{\circ}_{15/2}$
1053.584	6	94914.1	
1053.542	3	94917.9	$18241_{11/2}-113158^{\circ}_{9/2}$
			$21535_{9/2}-116453^{\circ}_{9/2}$
1053.412	1	94929.6	
1053.344	40	94935.8	$26446_{7/2}-121382^{\circ}_{9/2}$
1053.260	2	94943.3	

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1053.177	1	94950.8	
1053.105	1	94957.3	
1053.021	100	94964.9	
1052.860	100 *c l*	94979.4	
1052.815	40	94983.4	
1052.633	1000	94999.9	$21238_{13/2}-116238^{\circ}_{15/2}$
1052.571	100	95005.5	$15525_{11/2}-110530^{\circ}_{13/2}$
1052.456	3	95015.8	$17627_{9/2}-112643^{\circ}_{11/2}$
1052.262	3	95033.4	
1052.202	5 *c l*	95038.8	
1052.133	5 *c l*	95045.0	
1051.929	30	95063.4	
1051.851	5	95070.5	$21238_{13/2}-116309^{\circ}_{11/2}$
1051.792	200	95075.8	$19649_{17/2}-114725^{\circ}_{17/2}$
1051.732	40	95081.2	
1051.568	200	95096.1	$19700_{11/2}-114797^{\circ}_{13/2}$
1051.423	30	95109.2	
1051.347	5	95116.1	$21611_{5/2}-116727^{\circ}_{5/2}$
1051.313	20	95119.2	$22527_{7/2}-117647^{\circ}_{7/2}$
1051.093	10	95139.1	
1050.961	5	95151.0	$23050_{3/2}-118201^{\circ}_{3/2}$
1050.881	10	95158.2	$21294_{7/2}-116453^{\circ}_{9/2}$
			$22527_{7/2}-117686^{\circ}_{5/2}$
1050.770	1	95168.3	$23442_{11/2}-118610^{\circ}_{13/2}$
1050.652	7	95179.0	
1050.595	3	95184.2	$20315_{9/2}-115499^{\circ}_{9/2}$
1050.433	20	95198.8	
1050.323	100	95208.8	
1050.107	70	95228.4	$18063_{9/2}-113291^{\circ}_{7/2}$
1050.056	20	95233.0	
1049.914	1	95245.9	
1049.546	20	95279.3	
1049.456	100	95287.5	$15045_{5/2}-110333^{\circ}_{7/2}$
			$26095_{11/2}-121382^{\circ}_{9/2}$
1049.228	20	95308.2	$21418_{5/2}-116727^{\circ}_{5/2}$
1049.086	2000	95321.1	$19649_{17/2}-114970^{\circ}_{19/2}$
1048.951	5	95333.3	$22747_{9/2}-118081^{\circ}_{9/2}$
1048.923	15	95335.9	$26095_{11/2}-121431^{\circ}_{13/2}$
1048.703	100 *c l*	95355.9	$15525_{11/2}-110881^{\circ}_{11/2}$
1048.672	20 *c l*	95358.7	$16135_{7/2}-111494^{\circ}_{5/2}$
			$18241_{11/2}-113600^{\circ}_{13/2}$
1048.643	200 *c l*	95361.3	$17534_{15/2}-112896^{\circ}_{15/2}$
1048.413	3	95382.2	
1048.318	4	95390.9	
1048.255	40	95396.6	$15525_{11/2}-110922^{\circ}_{9/2}$
1048.122	7	95408.7	$22277_{3/2}-117686^{\circ}_{5/2}$
1047.966	3	95422.9	$18241_{11/2}-113664^{\circ}_{11/2}$
1047.924	8	95426.8	$15454_{13/2}-110881^{\circ}_{11/2}$
1047.811	100	95437.1	$19360_{13/2}-114797^{\circ}_{13/2}$
			$23442_{11/2}-118879^{\circ}_{11/2}$

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1047.752	1	95442.4	
1047.625	10	95454.0	
1047.375	10 *c l*	95476.8	$16516_{7/2}-111993^{\circ}_{9/2}$
1047.352	10 *c l*	95478.9	
1047.244	3000	95488.7	$17534_{15/2}-113023^{\circ}_{17/2}$
1047.105	3	95501.4	
1047.048	1	95506.6	
1046.941	3	95516.4	
1046.779	300	95531.1	
1046.700	20	95538.4	
1046.594	1	95548.0	$19872_{7/2}-115420^{\circ}_{7/2}$
1046.543	1	95552.7	
1046.195	500	95584.5	$15525_{11/2}-111110^{\circ}_{13/2}$
1046.113	10	95592.0	
1046.014	30	95601.0	$18063_{9/2}-113664^{\circ}_{11/2}$
1045.900	10	95611.4	
1045.858	100	95615.3	
1045.765	5	95623.8	$19700_{11/2}-115324^{\circ}_{9/2}$
1045.707	20	95629.1	
1045.511	10 *b l*	95647.0	
1045.447	20 *c l*	95650.9	
1045.411	300 *c l*	95656.2	$15454_{13/2}-111110^{\circ}_{13/2}$
1045.248	8	95671.1	$14859_{11/2}-110530^{\circ}_{13/2}$
1045.181	1	95677.2	
1045.049	1	95689.3	
1044.993	4	95694.4	
1044.909	30	95702.1	$18211_{5/2}-113914^{\circ}_{5/2}$
			$19700_{11/2}-115403^{\circ}_{11/2}$
1044.851	10	95707.4	$19700_{11/2}-115408^{\circ}_{13/2}$
1044.608	30	95729.7	
1044.239	50	95763.5	
1044.203	50	95766.8	
1044.117	3	95774.7	$14558_{9/2}-110333^{\circ}_{7/2}$
1044.029	500	95782.8	$17113_{13/2}-112896^{\circ}_{15/2}$
1043.970	3	95788.2	$21535_{9/2}-117323^{\circ}_{11/2}$
1043.853	50	95798.9	$19700_{11/2}-115499^{\circ}_{9/2}$
1043.797	500	95804.1	$18921_{15/2}-114725^{\circ}_{17/2}$
1043.639	10	95818.6	$21755_{11/2}-117574^{\circ}_{11/2}$
1043.501	50	95831.2	
1043.294	5	95850.2	
1043.223	200	95856.8	$16135_{7/2}-111993^{\circ}_{9/2}$
1043.110	10	95867.2	
1042.964	1000	95880.6	$15454_{13/2}-111335^{\circ}_{15/2}$
1042.819	10	95893.9	
1042.651	7	95909.4	
1042.478	100	95925.3	$32288_{3/2}-128214^{\circ}_{3/2}$
1042.306	2	95941.1	$22527_{7/2}-118468^{\circ}_{9/2}$
1042.250	20	95946.3	
1042.031	3	95966.4	
1041.963	60	95972.7	$25409_{7/2}-121382^{\circ}_{9/2}$
1041.872	100	95981.1	
1041.740	100	95993.2	$20315_{9/2}-116309^{\circ}_{11/2}$
1041.625	100	96003.8	$17627_{9/2}-113630^{\circ}_{7/2}$
1041.563	20	96009.6	$21238_{13/2}-117248^{\circ}_{13/2}$
1041.459	400	96019.1	$21755_{11/2}-117775^{\circ}_{13/2}$
1041.260	200	96037.5	$17627_{9/2}-113664^{\circ}_{11/2}$
1041.205	20	96042.6	$19360_{13/2}-115403^{\circ}_{11/2}$
1041.145	100	96048.1	$19360_{13/2}-115408^{\circ}_{13/2}$
1041.002	60	96061.3	$25033_{9/2}-121095^{\circ}_{11/2}$
1040.849	10	96075.4	$21611_{5/2}-117686^{\circ}_{5/2}$
1040.646	50	96094.2	$19308_{11/2}-115403^{\circ}_{11/2}$
1040.591	100	96099.2	$19308_{11/2}-115408^{\circ}_{13/2}$
1040.437	6	96113.5	
1040.387	3	96118.1	
1040.247	20	96131.0	$22747_{9/2}-118879^{\circ}_{11/2}$
1040.180	100	96137.2	$20315_{9/2}-116453^{\circ}_{9/2}$
1040.139	50	96141.0	
1040.082	5	96146.3	
1040.051	5	96149.1	$19872_{7/2}-116021^{\circ}_{7/2}$
1039.943	10	96159.1	
1039.778	50	96174.4	
1039.380	10	96211.2	
1039.253	60 *c l*	96223.0	$15045_{5/2}-111268^{\circ}_{3/2}$
1039.200	50 *c l*	96227.9	$21418_{5/2}-117647^{\circ}_{7/2}$
1039.156	100 *c l*	96231.9	$19700_{11/2}-115933^{\circ}_{11/2}$
1039.033	5	96243.3	
1038.962	10	96249.9	$14859_{11/2}-111110^{\circ}_{13/2}$
1038.773	3	96267.4	$21418_{5/2}-117686^{\circ}_{5/2}$
1038.451	10	96297.3	$15045_{5/2}-111342^{\circ}_{7/2}$
1038.356	7	96306.1	
1038.293	1000	96311.9	$19360_{13/2}-115672^{\circ}_{15/2}$
1038.186	400	96321.8	$14558_{9/2}-110881^{\circ}_{11/2}$
1038.066	40	96333.0	
1037.862	5	96351.9	$21294_{7/2}-117647^{\circ}_{7/2}$
1037.738	50 *c l*	96363.4	$14558_{9/2}-110922^{\circ}_{9/2}$
1037.703	50 *c l*	96366.7	
1037.584	20	96377.7	
1037.479	5	96387.5	$22080_{7/2}-118468^{\circ}_{9/2}$
1037.432	2	96391.9	$21148_{3/2}-117540^{\circ}_{3/2}$
			$21294_{7/2}-117686^{\circ}_{5/2}$
1037.390	30	96395.8	
1037.232	10	96410.4	$31803_{1/2}-128214^{\circ}_{3/2}$
1036.823	15	96448.5	
1036.749	5	96455.4	
1036.623	10	96467.1	$15525_{11/2}-111993^{\circ}_{9/2}$
1036.410	60	96486.9	$17113_{13/2}-113600^{\circ}_{13/2}$
			$18921_{15/2}-115408^{\circ}_{13/2}$
1036.174	40 *c l*	96508.9	
1036.151	40 *c l*	96511.0	
1035.765	8 *b l*	96547.0	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1035.675	30	96555.4	$18241_{11/2}-114797^{\circ}_{13/2}$
1035.554	10	96566.7	$20160_{3/2}-116727^{\circ}_{5/2}$
1035.386	20	96582.3	
1035.312	10	96589.2	$19649_{17/2}-116238^{\circ}_{15/2}$
1035.260	10	96594.1	$24788_{9/2}-121382^{\circ}_{9/2}$
1035.111	50	96607.0	$19700_{11/2}-116309^{\circ}_{11/2}$
1035.063	2	96612.5	
1034.937	3	96624.2	$19308_{11/2}-115933^{\circ}_{11/2}$
1034.826	5	96634.6	
1034.804	30	96636.6	
1034.338	100	96680.2	$18990_{7/2}-115670^{\circ}_{7/2}$
1034.114	7	96701.1	
1034.045	20 *c l*	96707.6	$21611_{5/2}-118318^{\circ}_{7/2}$
1034.012	10 *c l*	96710.7	
1033.827	10	96728.0	
1033.787	5	96731.7	
1033.738	20	96736.3	$21535_{9/2}-118271^{\circ}_{11/2}$
1033.680	20	96741.7	
1033.652	10	96744.4	$24788_{9/2}-121532^{\circ}_{11/2}$
1033.582	100	96750.9	$18921_{15/2}-115672^{\circ}_{15/2}$
1033.424	5	96765.7	
1033.329	30	96774.6	
1033.238	50 *c l*	96783.1	$21535_{9/2}-118318^{\circ}_{7/2}$
1033.207	20 *c l*	96786.0	$21294_{7/2}-118081^{\circ}_{9/2}$
1033.070	15	96798.9	$20848_{5/2}-117647^{\circ}_{7/2}$
1032.977	2	96807.6	
1032.798	70	96824.4	$21238_{13/2}-118063^{\circ}_{15/2}$
1032.496	2	96852.7	
1032.450	200	96857.0	
1032.299	10	96871.2	
1032.221	7	96878.5	$19360_{13/2}-116238^{\circ}_{15/2}$
1032.147	2	96885.4	
1032.083	400	96891.4	
1031.870	10	96911.4	$24470_{7/2}-121382^{\circ}_{9/2}$
1031.635	20	96933.5	$21535_{9/2}-118468^{\circ}_{9/2}$
1031.536	300	96942.8	$13352_{11/2}-110295^{\circ}_{11/2}$
1031.435	5	96952.3	
1031.360	3	96959.4	
1031.297	2	96965.3	
1031.171	20	96977.1	
1030.944	5	96998.5	
1030.851	300	97007.2	$20315_{9/2}-117323^{\circ}_{11/2}$
1030.687	50	97022.7	$16135_{7/2}-113158^{\circ}_{9/2}$
1030.600	5	97030.8	
1030.500	20	97040.3	$16516_{7/2}-113556^{\circ}_{5/2}$
1030.329	20	97056.4	$23442_{11/2}-120498^{\circ}_{13/2}$
1030.193	40	97069.2	
1030.125	3	97075.6	
1030.047	20	97082.9	$18241_{11/2}-115324^{\circ}_{9/2}$
1029.785	20	97107.6	
1029.711	200	97114.6	$16516_{7/2}-113630^{\circ}_{7/2}$
1029.631	50	97122.2	
1029.393	5	97144.6	$19308_{11/2}-116453^{\circ}_{9/2}$
1029.284	10*h*	97154.9	
1029.212	100	97161.7	$18241_{11/2}-115403^{\circ}_{11/2}$
1029.158	30	97166.8	$18241_{11/2}-115408^{\circ}_{13/2}$
1029.032	2000	97178.7	$13352_{11/2}-110530^{\circ}_{13/2}$
1028.901	100	97191.1	$17534_{15/2}-114725^{\circ}_{17/2}$
1028.711	8*h*	97209.0	$18211_{5/2}-115420^{\circ}_{7/2}$
1028.277	10	97250.1	
1028.164	20 *c l*	97260.8	$18063_{9/2}-115324^{\circ}_{9/2}$
1028.029	2	97273.5	
1027.569	100 *b l*	97317.1	$18921_{15/2}-116238^{\circ}_{15/2}$
1027.488	10*h*	97324.7	
1027.226	40	97349.6	
1027.146	3	97357.1	$18063_{9/2}-115420^{\circ}_{7/2}$
1026.922	2	97378.4	
1026.706	1	97398.9	
1026.477	20	97420.6	$16135_{7/2}-113556^{\circ}_{5/2}$
1026.415	1	97426.5	
1026.333	2	97434.3	$14558_{9/2}-111993^{\circ}_{9/2}$
1026.251	100	97442.0	$15454_{13/2}-112896^{\circ}_{15/2}$
1026.183	500	97448.5	$12846_{9/2}-110295^{\circ}_{11/2}$
1026.030	100 *c l*	97463.0	$18990_{7/2}-116453^{\circ}_{9/2}$
1025.999	10 *c l*	97466.0	
1025.945	4	97471.1	$23647_{13/2}-121119^{\circ}_{15/2}$
1025.694	40*h*	97495.0	$16135_{7/2}-113630^{\circ}_{7/2}$
1025.243	10	97537.8	$23844_{9/2}-121382^{\circ}_{9/2}$
1025.144	50	97547.3	$19700_{11/2}-117248^{\circ}_{13/2}$
1024.944	10*h*	97566.3	
1024.711	10*h*	97588.5	$18211_{5/2}-115800^{\circ}_{5/2}$
1024.358	8	97622.1	$19700_{11/2}-117323^{\circ}_{11/2}$
1024.308	1	97626.9	
1024.210	5	97636.2	
1024.123	1	97644.5	$16135_{7/2}-113780^{\circ}_{9/2}$
1024.036	10	97652.8	$23442_{11/2}-121095^{\circ}_{11/2}$
1023.976	20	97658.5	
1023.670	5 *c l*	97687.7	$23844_{9/2}-121532^{\circ}_{11/2}$
1023.573	30	97697.0	$17627_{9/2}-115324^{\circ}_{9/2}$
1023.268	100	97726.1	
1023.223	10	97730.4	$23651_{7/2}-121382^{\circ}_{9/2}$
1022.935	200	97757.9	$13352_{11/2}-111110^{\circ}_{13/2}$
1022.900	10 *c l*	97761.3	
1022.756	50	97775.0	$19872_{7/2}-117647^{\circ}_{7/2}$
1022.560	2	97793.8	$17627_{9/2}-115420^{\circ}_{7/2}$
1022.395	2	97809.6	$18211_{5/2}-116021^{\circ}_{7/2}$
1022.301	4	97818.5	
1022.146	4	97833.4	
1022.077	4	97840.0	
1021.865	5*h*	97860.3	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1021.764	1	97867.0	$18063_{9/2}-115933^{\circ}_{11/2}$	1013.841	4	98634.8	$22747_{9/2}-121382^{\circ}_{9/2}$
1021.726	30	97873.6	$17534_{15/2}-115408^{\circ}_{13/2}$	1013.780	30	98640.7	$13352_{11/2}-111993^{\circ}_{9/2}$
			$19700_{11/2}-117574^{\circ}_{11/2}$	1013.462	100	98671.7	
1021.664	7	97879.5		1013.354	5	98682.2	$17627_{9/2}-116309^{\circ}_{11/2}$
1021.578	15	97887.8	$19360_{13/2}-117248^{\circ}_{13/2}$	1013.142	80	98702.8	$19360_{13/2}-118063^{\circ}_{15/2}$
1021.352	1000	97909.4	$14859_{11/2}-112769^{\circ}_{13/2}$	1012.832	5	98733.1	$14558_{9/2}-113291^{\circ}_{7/2}$
1021.150	20	97928.8					$29835_{9/2}-128568^{\circ}_{9/2}$
1021.039	7	97939.4	$19308_{11/2}-117248^{\circ}_{13/2}$	1012.760	1	98740.1	$14859_{11/2}-113600^{\circ}_{13/2}$
1020.990	50	97944.2	$23175_{13/2}-121119^{\circ}_{15/2}$	1012.300	2	98784.9	$22747_{9/2}-121532^{\circ}_{11/2}$
1020.609	10	97980.7		1012.101	400	98804.4	$14859_{11/2}-113664^{\circ}_{11/2}$
1020.252	5	98015.0		1011.809	50	98832.9	$18211_{5/2}-117044^{\circ}_{7/2}$
1020.189	5	98021.0		1011.307	10	98881.9	
1020.052	40	98034.2	$12846_{9/2}-110881^{\circ}_{11/2}$	1011.012	60	98910.8	
1019.982	2	98040.9	$20160_{3/2}-118201^{\circ}_{3/2}$	1010.914	10	98920.4	$14859_{11/2}-113780^{\circ}_{9/2}$
1019.890	10	98049.8		1010.560	50	98955.0	$17534_{15/2}-116489^{\circ}_{17/2}$
1019.699	1	98068.2	$18241_{11/2}-116309^{\circ}_{11/2}$	1010.282	20	98982.3	
1019.631	60	98074.7	$15525_{11/2}-113600^{\circ}_{13/2}$	1010.153	20	98994.9	
			$19700_{11/2}-117775^{\circ}_{13/2}$	1010.034	20	99006.6	$18241_{11/2}-117248^{\circ}_{13/2}$
1019.534	60	98084.0	$14558_{9/2}-112643^{\circ}_{11/2}$	1009.750	1	99034.4	
1019.474	1	98089.8	$23442_{11/2}-121532^{\circ}_{11/2}$	1009.570	1	99052.1	
1019.311	100	98105.5		1009.029	1	99105.2	$14558_{9/2}-113664^{\circ}_{11/2}$
1019.207	2	98115.5		1008.938	1	99114.1	
1018.968	200	98138.5	$15525_{11/2}-113664^{\circ}_{11/2}$	1008.742	15	99133.4	
1018.890	3	98146.0	$15454_{13/2}-113600^{\circ}_{13/2}$	1008.612	500	99146.2	$12846_{9/2}-111993^{\circ}_{9/2}$
1018.544	1	98179.4		1008.536	3	99153.6	$16516_{7/2}-115670^{\circ}_{7/2}$
1018.373	5	98195.8		1008.285	2	99178.3	$19700_{11/2}-118879^{\circ}_{11/2}$
1018.242	100	98208.5	$19872_{7/2}-118081^{\circ}_{9/2}$	1008.220	20*h*	99184.7	
1017.853	2	98246.0	$15045_{5/2}-113291^{\circ}_{7/2}$	1007.847	40	99221.4	$14558_{9/2}-113780^{\circ}_{9/2}$
			$18063_{9/2}-116309^{\circ}_{11/2}$	1007.459	40	99259.6	$18063_{9/2}-117323^{\circ}_{11/2}$
1017.516	10	98278.6					$21238_{13/2}-120498^{\circ}_{13/2}$
1017.396	5 *c l*	98290.1	$17113_{13/2}-115403^{\circ}_{11/2}$	1007.392	1	99266.2	
1017.345	50 *c l*	98295.1	$17113_{13/2}-115408^{\circ}_{13/2}$	1007.336	7	99271.7	$15525_{11/2}-114797^{\circ}_{13/2}$
1017.310	20 *c l*	98298.4	$14859_{11/2}-113158^{\circ}_{9/2}$	1007.088	1	99296.2	
1017.231	5	98306.1	$17627_{9/2}-115933^{\circ}_{11/2}$	1006.829	3	99321.7	
1016.991	10	98329.3		1006.681	5	99336.3	
1016.714	5	98356.1		1006.383	3	99365.7	
1016.471	200	98379.6	$15454_{13/2}-113833^{\circ}_{15/2}$	1006.221	3	99381.7	
1015.785	20	98446.0	$19872_{7/2}-118318^{\circ}_{7/2}$	1005.857	10	99417.7	$13352_{11/2}-112769^{\circ}_{13/2}$
1015.730	10	98451.4					$17627_{9/2}-117044^{\circ}_{7/2}$
1015.699	2	98454.4		1005.676	5	99435.6	$18211_{5/2}-117647^{\circ}_{7/2}$
1015.469	5	98476.7		1005.584	1	99444.7	
1015.340	1	98489.2		1005.280	3	99474.8	
1015.274	30	98495.6		1004.912	30	99511.2	
1015.170	8	98505.7		1004.533	2	99548.8	$1398^{\circ}_{11/2}-100947_{9/2}$
1015.046	3	98517.7	$29835_{9/2}-128352^{\circ}_{9/2}$	1004.259	1	99575.9	
1014.815	3	98540.1		1003.399	8	99661.2	
1014.750	10	98546.4	$29835_{9/2}-128381^{\circ}_{11/2}$	1003.258	10	99675.2	
1014.622	30	98558.9	$17113_{13/2}-115672^{\circ}_{15/2}$	1002.876	1	99713.2	
1014.231	10 *c l*	98596.9	$19872_{7/2}-118468^{\circ}_{9/2}$	1002.724	1	99728.3	
1014.202	100	98599.7	$14558_{9/2}-113158^{\circ}_{9/2}$	1002.035	20 *b l*	99796.9	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region*—Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
1001.528	4	99847.4		979.694	2	102072.7	
1001.224	50 *c l*	99877.7		979.218	1	102122.3	$19308_{11/2}-121431^{\circ}_{13/2}$
1001.197	20 *c l*	99880.4					$26446_{7/2}-128568^{\circ}_{9/2}$
1000.630	80	99937.0	$14859_{11/2}-114797^{\circ}_{13/2}$	978.001	4	102249.4	$15525_{11/2}-117775^{\circ}_{13/2}$
			$16516_{7/2}-116453^{\circ}_{9/2}$	977.928	7	102257.0	$18241_{11/2}-120498^{\circ}_{13/2}$
1000.525	7	99947.5	$17627_{9/2}-117574^{\circ}_{11/2}$	976.676	10	102388.1	$14859_{11/2}-117248^{\circ}_{13/2}$
1000.351	3	99964.9		974.231	2	102645.1	
1000.023	5	99997.7	$21535_{9/2}-121532^{\circ}_{11/2}$	973.100	3	102764.4	$14558_{9/2}-117323^{\circ}_{11/2}$
999.499	30	100050.1		972.263	1	102852.8	
999.118	3	100088.3	$21294_{7/2}-121382^{\circ}_{9/2}$	972.148	2	102865.0	
			$2893^{\circ}_{13/2}-102981_{13/2}$	971.675	10	102915.1	$14859_{11/2}-117775^{\circ}_{13/2}$
998.931	10	100107.0	$18211_{5/2}-118318^{\circ}_{7/2}$	971.358	1	102948.6	
998.827	1	100117.4		970.727	5	103015.6	$14558_{9/2}-117574^{\circ}_{11/2}$
997.048	10	100296.1		970.065	10	103085.9	
996.885	1	100312.5	$12846_{9/2}-113158^{\circ}_{9/2}$	969.090	20	103189.6	$18241_{11/2}-121431^{\circ}_{13/2}$
			$13352_{11/2}-113664^{\circ}_{11/2}$	968.140	2	103290.8	$18241_{11/2}-121532^{\circ}_{11/2}$
996.425	5	100358.8		966.531	2	103462.8	$12846_{9/2}-116309^{\circ}_{11/2}$
996.321	10	100369.3	$18241_{11/2}-118610^{\circ}_{13/2}$	965.313	10	103593.3	$24788_{9/2}-128381^{\circ}_{11/2}$
995.957	2	100405.9	$18063_{9/2}-118468^{\circ}_{9/2}$	964.531	1	103677.3	
995.571	2	100444.9	$12846_{9/2}-113291^{\circ}_{7/2}$	963.849	10	103750.7	$14859_{11/2}-118610^{\circ}_{13/2}$
995.520	5*h*	100450.0		954.857	8	104727.7	$12846_{9/2}-117574^{\circ}_{11/2}$
995.377	3	100464.4	$14859_{11/2}-115324^{\circ}_{9/2}$	936.296	5	106803.8	
994.598	70	100543.1	$14859_{11/2}-115403^{\circ}_{11/2}$	935.046	3	106946.6	
994.545	6	100548.5	$14859_{11/2}-115408^{\circ}_{13/2}$	934.970	5	106955.3	
994.380	3	100565.2	$4453^{\circ}_{15/2}-105019_{13/2}$	934.074	2	107057.9	$21294_{7/2}-128352^{\circ}_{9/2}$
994.123	1	100591.2	$16135_{7/2}-116727^{\circ}_{5/2}$	932.196	3	107273.6	$21294_{7/2}-128568^{\circ}_{9/2}$
			$2893^{\circ}_{13/2}-103484_{15/2}$	931.153	40	107393.7	$25979_{15/2}-133373^{\circ}_{17/2}$
994.075	2	100596.0	$4453^{\circ}_{15/2}-105049_{15/2}$	920.003	1	108695.3	
993.795	100	100624.4	$15045_{5/2}-115670^{\circ}_{7/2}$	914.635	1	109333.2	
993.642	2	100639.9	$14859_{11/2}-115499^{\circ}_{9/2}$	913.825	60	109430.1	
993.600	1	100644.1	$17627_{9/2}-118271^{\circ}_{11/2}$	912.340	1	109608.3	
993.422	4	100662.2	$17113_{13/2}-117775^{\circ}_{13/2}$	909.894	4	109902.9	
992.169	5	100789.3	$0^{\circ}_{9/2}-100788_{7/2}$	907.103	1	110241.1	$18211_{5/2}-128453^{\circ}_{7/2}$
992.085	30	100797.8	$19700_{11/2}-120498^{\circ}_{13/2}$	904.386	2	110572.2	
990.750	5	100933.6	$12846_{9/2}-113780^{\circ}_{9/2}$	903.766	2	110648.1	
989.627	2	101048.2		902.999	3	110742.1	
989.381	20	101073.3	$14859_{11/2}-115933^{\circ}_{11/2}$	896.172	1	111585.7	
988.353	2	101178.4		894.647	3	111775.9	
988.001	60	101214.5	$27138_{7/2}-128352^{\circ}_{9/2}$	890.276	1	112324.7	
987.960	3	101218.7	$1398^{\circ}_{11/2}-102617_{11/2}$	889.296	2	112448.5	
987.344	4	101281.8		888.257	1	112580.0	
987.023	2	101314.8	$27138_{7/2}-128453^{\circ}_{7/2}$	887.360	4	112693.8	
985.880	2	101432.2	$1398^{\circ}_{11/2}-102830_{9/2}$	886.233	2	112837.1	
985.120	3	101510.5	$19872_{7/2}-121382^{\circ}_{9/2}$	885.575	2	112921.0	
983.927	3	101633.6		885.279	20	112958.7	
983.461	8	101681.7	$19700_{11/2}-121382^{\circ}_{9/2}$	884.158	40	113102.0	
982.796	4	101750.5	$14558_{9/2}-116309^{\circ}_{11/2}$	883.838	3	113142.9	
982.709	20	101759.5	$19360_{13/2}-121119^{\circ}_{15/2}$	882.990	3	113251.6	
982.340	1	101797.8	$15525_{11/2}-117323^{\circ}_{11/2}$	882.336	1	113335.5	
979.899	1	102051.3	$13352_{11/2}-115403^{\circ}_{11/2}$	881.591	3	113431.3	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
880.303	10	113597.2		856.826	1	116709.8	
879.840	2	113657.0		856.740	2*h*	116721.5	
879.441	10	113708.6	$14859_{11/2}$—$128568^{\circ}_{9/2}$	856.285	1	116783.5	
878.749	1	113798.1		856.192	20	116796.2	
878.215	10	113867.3		855.808	3	116848.6	
876.355	2	114109.0		855.718	20	116860.9	
876.305	1	114115.5		855.422	1	116901.4	
875.339	1	114241.4		855.038	1	116953.9	
874.680	2	114327.5		854.692	1	117001.2	
874.481	1	114353.5		854.254	1	117061.2	
874.173	1	114393.8		853.782	2	117125.9	
874.147	1	114397.2		853.413	10	117176.6	
874.051	1	114409.8		853.318	2	117189.6	
873.749	1	114449.3		853.229	4	117201.8	
872.569	1	114604.1		853.120	1	117216.8	
872.104	30	114665.2		853.054	1	117225.9	
871.932	1	114687.8		852.968	1	117237.7	
871.699	3	114718.5		851.867	2	117389.2	
871.069	2	114801.5		851.524	2	117436.5	
870.893	1	114824.7		851.438	3	117448.4	
869.598	1	114995.7		851.361	8	117459.0	
868.558	10	115133.4		851.301	200	117467.3	
868.490	1	115142.4		851.168	15	117485.6	
868.414	1	115152.4		850.903	5	117522.2	
866.285	4	115435.4		850.331	5	117601.3	
864.910	1	115619.0		850.156	10*b l*	117625.5	
864.582	1	115662.8		850.061	1	117638.6	
864.320	1	115697.9		850.011	1	117645.5	
863.941	8	115748.6		849.895	20	117661.6	
863.349	1	115828.0		849.803	20	117674.3	
863.131	3*h*	115857.3		848.718	1	117824.8	
862.823	2	115898.6		848.657	10	117833.2	
862.427	2	115951.8		848.440	1	117863.4	
862.227	1	115978.7		847.729	1	117962.2	
861.535	2	116071.9		847.474	3	117997.7	
861.498	1	116076.9		846.565	2	118124.4	
861.307	1	116102.6		846.209	2	118174.1	
860.721	2	116181.7		845.710	7	118243.8	
860.522	2	116208.5		845.231	10	118310.8	
860.313	3	116236.8		845.066	5	118334.0	
859.956	2	116285.0		844.788	3	118372.9	
859.730	3	116315.6		844.395	100	118428.0	
859.541	1	116341.2		843.998	2	118483.7	
859.299	1	116373.9		843.887	10	118499.3	
859.102	7	116400.6		843.542	40*b l*	118547.7	
857.723	8	116587.8		843.338	200	118576.4	
857.614	1	116602.6		843.312	10*c l*	118580.1	
857.348	5	116638.8		842.497	40	118694.8	
857.210	1	116657.5		842.384	1	118710.7	
857.091	1	116673.7		842.130	1	118746.5	

[a] For doubly-classified lines, the wavelength is entered only once.

TABLE X. *Observed spectral lines of* Pr III *in the vacuum ultra violet region* — Continued

λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]	λ_{vac} Å	Intensity	σ (cm^{-1})	Classification [a]
841.990	3	118766.2		832.631	2	120101.2	
841.779	1	118796.0		832.164	1	120168.6	
841.628	20 *b l*	118817.3		832.013	1	120190.4	
841.426	8	118845.9		831.919	3	120204.0	
841.015	4	118903.9		831.846	10	120214.6	
840.890	30 *c l*	118921.6		831.265	200	120298.4	
840.871	10 *c l*	118924.3		831.136	1	120317.2	
840.459	6	118982.6		830.927	2	120347.5	
840.282	8	119007.7		830.386	1	120425.9	
840.057	60	119039.5		830.061	2	120473.1	
839.995	60	119048.3		829.325	3	120580.0	
839.619	1	119101.6		828.364	50	120719.9	
839.529	1	119114.4		828.169	1	120748.3	
839.474	2	119122.2		828.134	1	120753.4	
839.358	30 *h*	119138.7		827.345	1	120868.6	
838.933	30	119199.0		825.989	30	121067.0	
838.809	1	119216.6		825.404	7	121152.8	
837.712	2	119372.8		824.880	3	121229.8	
837.223	3	119442.5		824.542	1	121279.4	
836.744	8	119510.9		823.117	1	121489.4	
836.295	1	119575.0		822.725	2	121547.3	
835.843	15 *b l*	119639.7		822.467	15	121585.4	
834.617	1	119815.4		821.942	10	121663.1	
833.478	10	119979.2					
833.190	10	120020.6					

[a] For doubly-classified lines, the wavelength is entered only once.

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